THE WHOLE EARTH STATION CATALOG

$9.00

1984 EDITION

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HURRICANE

Your new antenna is all set up, adjusted, fine tuned and the service technician is on his way back to the shop. Now the real test begins. Will it continue to perform? For how long will it maintain the picture quality it has today?

Your antenna will have to face the wind and weather every hour of every day of its life. This will be its toughest test. To survive, you'll need equipment strong enough to take whatever nature can throw at it. You'll need Paraclipse.

It is impossible to gather conclusive data about the effects of storm generated stress on an antenna unless you can control the storm. We wanted to put our equipment through an intense, concentrated weather test to measure its

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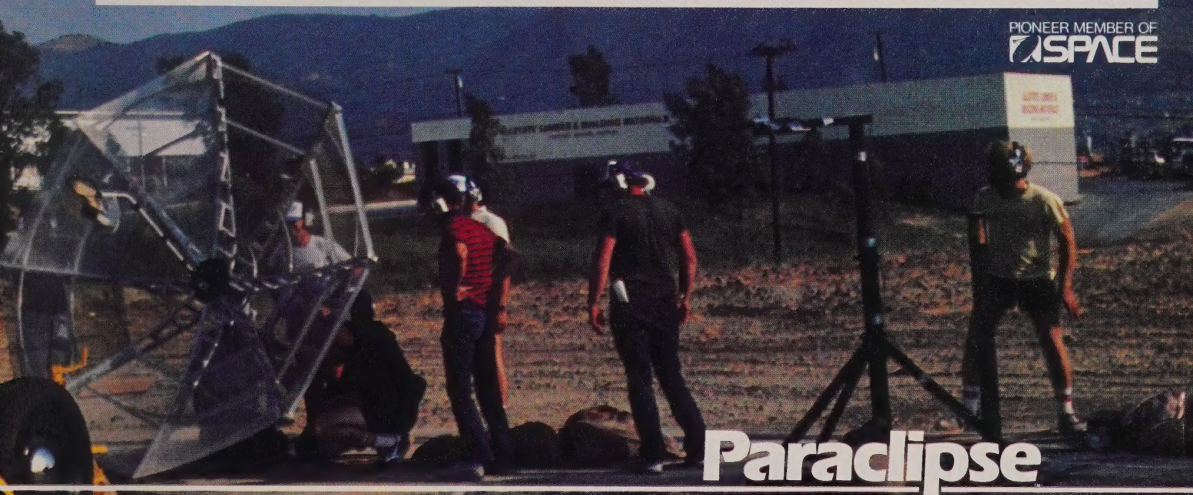
PIONEER MEMBER OF SPACE



Paraclipse

HIGH PERFORMANCE SATELLITE TELEVISION SYSTEM

performance, so we hired a "professional hurricane" to see if we could break a Paraclipse.

We dumped 337 gallons of water per minute into a 95 mph windstream to create the wind load equivalent of a 140 mph storm. Each antenna was tested at five different elevation settings and was blasted from eight different angles.

After several hours of abuse, both Paraclipse antennas emerged undamaged and in perfect shape. Off-air satellite signal evaluation at the end of the tests, indicated the Paraclipse antennas maintained the same electrical parameters as prior to the tests. After testing, measurements show no warping or distortion of the welded aluminum truss structure or mount assembly. Both antennas, in spite of loads to which they were subjected, maintained parabolic symmetry and accuracy. Neither antenna suffered any damage; not one piece of mesh was bent or one clip lost. Both antennas were absolutely stock items assembled according to standard instructions.

The welded aluminum Rib & Ring Truss System pioneered by Paraclipse is still the lightest, strongest, most accurate design available. The concentric ring trusses, to which the heavy expanded aluminum mesh is fastened, form a perfect compound parabolic shape that even a hurricane can't bend. The all steel polar mount and base are powder coated to further seal and protect them from the elements.

A Paraclipse system has the structural strength and dimensional stability to maintain the integrity of its parabolic shape under the worst of conditions. Paraclipse materials are chosen for their lightweight strength and corrosion resistant properties. Every aspect of the Paraclipse design represents strength in performance.

Paraclipse, strong, lightweight, weatherproof, shippable, easily assembled with simple hand tools, an affordable quality antenna from a very reputable manufacturer.

Dollar for dollar, you just can't buy more performance.

Paradigm Manufacturing, Inc.
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*Patent applied for

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From the publisher...

Three years ago with our first Whole Earth Station Catalog, we set out to provide a comprehensive, readily accessible data base of information on the satellite business.

Now, like the satellite business itself, the catalog has tripled in size, this year including a special callbook, a dealer section and a larger general business directory in the center.

We're confident that you'll find just about everyone who is anyone in the current edition. As always, if your company is not included, please drop us a line at the address below.

LP Covens

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While Channel Guide has made every effort to list only manufacturers of quality products and reputable distributors and dealers, listings in the Whole Earth Station Catalog do not necessarily mean we endorse any of the products or businesses listed.

Satellites: History of Satellite Technology

by Terry Easton

By Isaac Newton's day (1642–1727), the basic space mechanics of celestial objects were understood, but the ability to place an artificial satellite into earth orbit was to be limited until sufficiently powerful launching vehicles (rockets) could be built. It was the Russian physicist K. E. Tsiolkovsky, whose first papers appeared in 1903, who proposed the use of high-energy liquid-fueled rockets. But it was not until 1926 that Robert H. Goddard, an American scientist, launched the first liquid-propellant rocket as a scientific experiment.

By the 1950s both the U.S. and Russian governments were hard at work using the German V-2 project technology and scientists captured at the end of World War II to construct new and powerful missiles. The Russians were first in space in 1957 with the successful launch of SPUTNIK I, a satellite about the size of a football that carried a tiny radio transmitter aloft. And within months the United States had launched its first satellite, EXPLORER I, whose on-board instruments detected the presence of the hitherto unknown Van Allen radiation belt, which surrounds and protects the earth.

By the early 1960s the cold war space race was on in earnest. Although the attention of the media became rapidly focused on manned space efforts such as the MERCURY, GEMINI, and APOLLO programs in the United States, and the VOSTOK, SALYUT, and SOYUZ programs in the U.S.S.R., the unmanned satellite programs were pressing quietly ahead.

Early on, military strategists saw the advantage of using satellites as surveillance devices. And cartographers hoped to accurately map the surface of the earth through electronic "eyes in the sky," because scientists were still unsure of the exact shape of the earth, or even of the distance between continents! In fact, some world maps were off by as much as a mile or more. Satellites would help to change all this.

Geologists were interested in using satellite detectors and cameras to locate oil and mineral deposits. The U.S. Navy expressed interest in providing navigational assistance to ships at sea by utilizing satellites to accurately pinpoint the ships' exact locations. Weather organizations and the world meteorological agencies saw the satellite as a way of looking down at massive storm formations from hundreds of miles in space. Even agriculture was interested in analyzing plant growth and predicting harvest yields by using infrared photographic pictures relayed back from circling satellites.

Private and governmental organizations also foresaw the use of satellites to provide telephone, telex, and even television communications, both within the borders of a country and internationally.

By the mid-1960s hundreds of satellites had been launched by the United States and the U.S.S.R. The French, Chinese, Indians, Italians, and others were soon to follow with their own rocket-launching facilities. The cultivation of space had become more than an element of national pride—it had become an economic necessity.

The Mechanics of Launching a Satellite

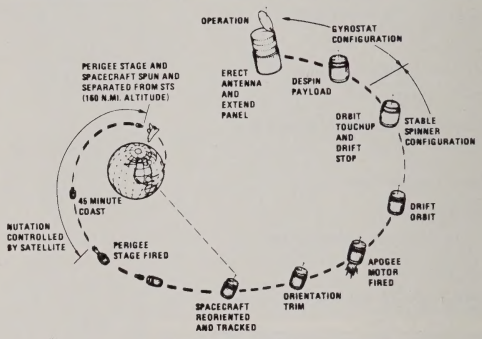
It is fascinating to consider that a 1000-pound metal box of components and batteries can be lifted from the earth and placed into an orbit circling the planet. How does it all work? Why doesn't the satellite simply fly off into space, or even fall back to earth?

The answer lies in the laws of gravity and orbital mechanics, first described accurately by Sir Isaac Newton in 1687. Gravity is simply the physical attraction of two bodies toward each other. The larger the body's size, the greater the attraction. The force of gravity is commonly measured in units of weight such as pounds or kilograms. To successfully lift a 1000-pound satellite into earth orbit, the rocket motors must have sufficient thrust to move this box several thousand miles straight up, directly opposing the force of the earth's gravity to pull the object back.

To most readily accomplish this, the rocket accelerates the satellite to a speed of several thousand miles per hour. The laws of gravity indicate that to break free from the pull of the earth, the rocket must be traveling at a speed, or velocity, of over 7 miles per second, or 25,000 miles per hour!

At speeds slower than that the satellite will be drawn back toward the earth, falling into a high-speed orbit, and circling the planet closer and closer until it ultimately reenters the earth's atmosphere and is consumed by the heat caused by buffeting friction of the thin air molecules found at high altitudes. If the satellite has a speed greater than the 7-mile-per-second escape velocity, it will fly off into space, never to return to the earth.

Satellites launched into low-altitude orbits circle the earth faster than



The launching of a communications satellite.
(Courtesy Hughes Corp.)

the earth turns; spy satellites flying at 100-mile altitudes may only take 90 minutes to complete one revolution. The satellites that are launched into high-altitude orbits (above 23,000 miles) circle the earth very slowly, taking over a day to make a complete revolution. At one specific orbit altitude, roughly 22,300 miles above the equator, a satellite will rotate around the earth precisely once every 24 hours; this orbit is called the geosynchronous orbit, or Clarke orbit in honor of the science-fiction writer Arthur C. Clarke.

The Clarke Orbit

In 1945 Clarke wrote an article in the British publication *Wireless World,* suggesting that an international communications system could be created using three geosynchronous satellites carefully located at three strategic points 22,300 miles above the equator. Clarke argued that to an observer or a tracking station on the earth's surface, these satellites would appear to stand still in the heavens, as the satellites would complete one revolution around the earth every 24 hours and the earth itself would be turning underneath at precisely the same rate.

The Clarke article presented a revolutionary idea, and it was treated as science fiction at the time. In those days telephone communications between North America and Europe were relayed over notoriously inferior high-frequency radio signals. The first transatlantic telephone cable would not be laid until the following decade, in 1956.

On July 10, 1962, the American Telephone and Telegraph Company (AT&T) launched TELSTAR I from Cape Canaveral. The several-dozen-pound satellite was carried into space by a NASA Thor-Delta rocket. Although not put into a geosynchronous orbit, TELSTAR did bring the first live television pictures from Great Britain to the United States. Circling the earth at a very low altitude, TELSTAR could only transmit for a few minutes at a time, however, and required massive earth station antennas to track its motions as it whizzed across the sky.

A few weeks after this spectacular success, the U.S. Congress adopted the Communications Satellite Act, which created a new private corporation, COMSAT, charged with the goal of building a global communications satellite network. Two years later, in 1964, an international consortium of countries called INTELSAT was formed to own the satellites that COMSAT would build and operate. Unlike TELSTAR, the INTELSAT satellites would be placed into geosynchronous orbits positioned strategically over the Atlantic, Pacific, and Indian

Cont'd on page 6

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3118 Thomas Place
Everman Industrial Park
Ft. Worth, TX 76140

(800) 433-2228

Ed Miller, President

PRODUCTS:

Actuators.

Founded: Not available.

ADM (Antenna Dev. & Mfg.)

P.O. Box 1178
Hwy. 67 South
Popular Bluff, MO 63901

James Gowen, President
Ed Randall, Sales Manager
Ron Rhodes, Marketing Manager

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Components sold/recommended: Amplica, Avantek and M/A-COM LNA's; Drake, Avcome, M/A-COM and KLM receivers.

Founded: 1969

Antenna Development & Manufacturing, Inc.

Amplica, Inc.

950 Lawrence Drive
Newbury Park, CA 91320

TVRO No.: (805) 499-2621; Main: (805) 498-9671
A.W. Perrigard, President
Asa Baird, Sales Manager
Jerry Moore, Marketing Manager

Founded: 1972

PRODUCTS:

Amplica manufactures LNA's and LNA/Downconverters. Amplica also makes a satellite receiver, single-conversion and the Amplivider, a unity gain power splitter.

Ancom (Alcoa/NEC)

130 Martin Lane
Elk Grove Village, IL 60007

(312) 640-8466

Paul L. Abernathy, Executive Vice President (Alcoa)
Dennis R. Fraser, Executive Vice President (Nec)
Robert G. Morrell, Vice President, Marketing

Founded: 1963

PRODUCTS:

Manufacture and sale of 12-GHz receiving systems for FSS/business applications, FSS/entertainment applications and Direct Broadcast Satellite service.

Anderson Scientific

P.O. Box 800
Black Hawk, SD 57718

(605) 787-4224

Mark Anderson, President
Scott Triggs, Sales Manager
Alan Anderson, Marketing Manager

Founded: 1963

PRODUCTS:

Anderson manufactures a unique block downconverter which converts frequency to UHF band dual-conversion satellite receiver.

Cont'd from page 4

oceans. Today more than a dozen INTELSAT satellites are operational, providing telephone, telex, and television communications to al points of the world.

Radio, Television, and Satellites (How Radio Frequencies Work)

To receive signals from the earth successfully and relay them back again, satellites use very-high-frequency radio waves operating in the microwave radio-frequency band.

Everything in life oscillates according to some periodical cycle, whether it is the electrons spinning around in the atoms of your bloodstream or the sound waves hitting your eardrum. Oscillating waves form the basis of all communications, both human and electrical. The most common form of oscillating wave is the sine wave, so named because of the geometric pattern it produces. When sine waves are produced by a musical instrument or a vocal cord, we call them audio waves, and they vibrate (or oscillate) at frequencies ranging from 20 to 20,000 cycles per second (or hertz, abbreviated Hz). Sine waves have two major properties: their frequency (the number of times they oscillate per second) and their amplitude (or loudness, with regard to audio waves).

Radio waves are also sine waves, produced electromagnetically by the interaction of magnetic and electric fields. Typically, they are generated by a radio transmitter and radiated into the atmosphere using an antenna.

The Electromagnetic Spectrum

Band	Approximate Frequencies	Usage
Very Low Frequencies (VLF)	50,000–100,000 Hz	Submarine Communications
Low Frequencies (LF)	1000,000 HZ–535 kHz	Navigational Aids
Medium Frequencies (MF)	535 kHz–1600 kHz	Am Radio
High Frequencies (HF)	1.6–50 MHz	Shortwave Radio
Very High Frequencies (VHF)	60–216 MHZ	VHF TV (Channels 2–13)
Ultrahigh Frequencies (UHF)	470–806 MHz	UHF TV (Channels 14–70)
Microwaves (MW)	1–20 GHz	Satellite Communications
Light	100–10,000 GHz	Infrared and Visible Light

Very-low-frequency radio waves, of the order of 50,000 Hz or so, are used to communicate with submarines while they are submerged, as these kinds of low-frequency waves have the ability to penetrate below the surface of the water. Medium-frequency radio waves are used to carry AM broadcasting station signals. The AM transmitters vary the amplitude of the sine-wave carrier in relation to the announcer's voice or the record's music. Very-high-frequency radio waves (VHF) are used worldwide to carry both FM radio broadcast stations and VHF television (Channels 2 to 13). The FM radio stations' transmitters shift the frequency of the carrier up and down in relation to the audio signal coming from the studio. This process of manipulating a radio station's carrier by varying its frequency is called frequency modulation.

Ultrahigh-frequency (UHF) radio waves are used to carry a second set of television channels, designated 14 to 70 on the television dial.

AM radio operates on frequencies from 535,000 Hz (or 535 kilohertz) to 1600 kHz. FM radio uses the 88–108-MHz band. VHF television runs from 54 MHz to several hundred million megahertz (the FM band is smack in the middle between TV Channels 6 and 7!). UHF channels start at 470 MHz and run up to 806 MHz.

Microwave frequencies begin at about 1000 MHz (or 1 gigahertz) and run up in frequency until they turn into visible light waves. At these superhigh frequencies, radio signals take on the characteristics of light waves. They can be reflected from mirrors and tend to travel by line of sight only. Communications satellites use microwaves operating in the frequency band of 3½ to 6 GHz, known as the C-band. Traveling 22,300 miles down from space, microwaves will not make it past the roof of a house; however, they can be picked up by a small receive-only earth station sitting in the backyard.

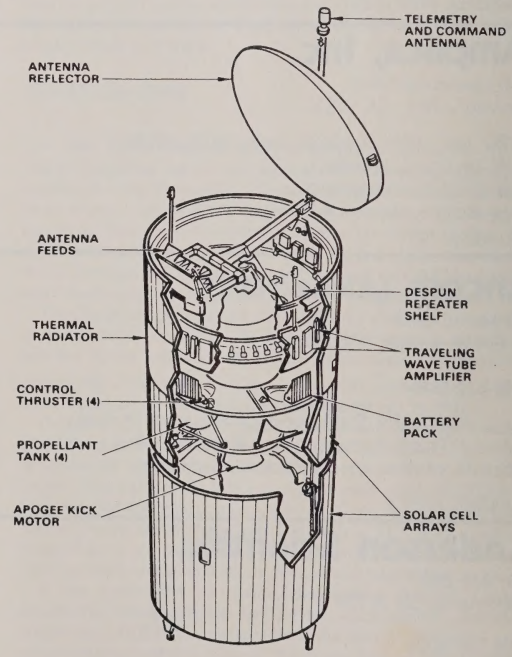
But microwave frequencies are not used only for satellite communications. Microwave ovens, medical diathermy equipment, and radar systems all utilize radio frequencies operating in the microwave portion of the electromagnetic spectrum. By and large, terrestrial telephone communications are also carried over microwave circuits using telephone company microwave transmission repeaters scattered at intervals of 40 miles or so across the country.

Networks and Satellites

The major television networks use the telephone company's backbone microwave network to carry TV programs from network control in New York to their nationwide television station affiliates. By installing elaborate automated switching centers throughout the United States, the Bell Telephone Company can connect any television station to or disconnect it from any network feed in a matter of seconds. During the fall, when the National Football League games are in season, as many as a dozen or more regional television network feeds are delivered to groups of nearby television stations under control of the master control centers. Of course, this kind of extensive terrestrial communications network is extraordinarily expensive. One television channel has the equivalent capacity to carry 2000 telephone conversations simultaneously, and it is not unusual to see a network spending upward of $100 million per year on communications channel charges. But until the launch of the domestic communications satellite systems in the mid-1970s, no other options were available!

Recognizing the need for domestic satellite communications to augment the expensive terrestrial microwave systems, the U.S. common carriers RCA and Western Union decided to launch their own SATCOM and WESTAR satellites to be used for voice, data, and television communications. COMSAT, the U.S. communications company that built the international satellite network, followed suit and leased its COMSTAR domestic satellite exclusively to AT&T and GTE for telephone company use.

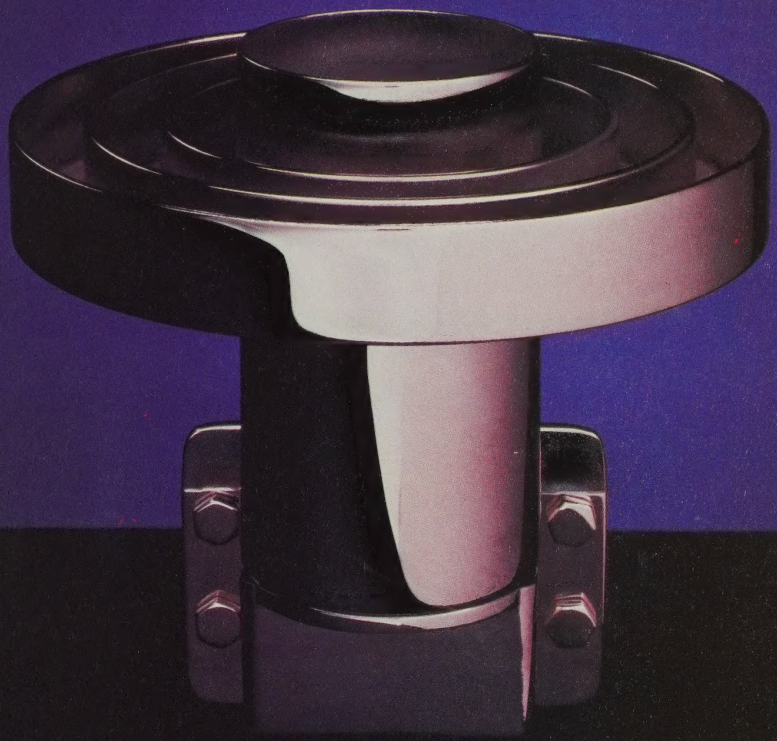
With the clever use of nationwide and spot transmitter downlink beams, and the careful reuse of frequencies, each of the newer satellites would have the capability of relaying 24 separate television pictures—one per transponder—throughout the United States.



Component locations on ANIK D Satellite.
(Courtesy Telsat Canada)

Cont'd on page 32

OUR FOCUS IS ON THE FUTURE.



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Antenna Technology Corp.

8711 Pinnacle Peak Road #C-103
Scottsdale, AZ 85255
(602) 264-7275
Eugene Augustin, President
Lloyd Bonner, Marketing Manager
Founded: 1979

PRODUCTS:
Simulsat — 3, 5, 7 multiple beam antennas.

Arunta Engineering

3111 E. Thomas Road
Phoenix, AZ 85016

(602) 956-7042

Ed Grotsky, President
Bob Young, Sales & Marketing Mgr.

PRODUCTS:
Stereo receiver, monorail receiver, IF filters (terrestrial interference filter, threshold extension filter, ½ transponder filter), stereo processor.

Founded: 1977

Automation Techniques, Inc.

1550 N. 105th S. Ave.
Tulsa, OK 74116

(918) 836-2584

Ted V. Anderson, President
Frank Tackett, Vice President, Sales & Marketing
Ed L. Covington, Chief Engineer

PRODUCTS:
Satellite receiver, GLR Family, (GLR 500, GLR 520, GLR 560, GLR 750, GLR 800).

Founded: 1978

A-V Electronics Marketing

4301 Northstar Blvd.
Great Falls, MT 59401

(406) 761-3283; (800) 548-9950

Robert W. Pingree, President
Chuck Uhl, General Manager, TVRO
Darrel Peterson, Marketing Director

Founded: Not available.

PRODUCTS:
Prodelin, National Microtech, Janeil, M/A-Com, Amplica, KLM, Intersat, Dexcel, Drake, Luxor, Avantek, ADEC, JVC, Panasonic, Hitachi, Pioneer, JVC Pro, Kloss, Commodore, Klipsch

Avantek, Inc.

941 Cottonwood Drive,
Milpitas, CA 95035

(408) 946-3080

Dr. E. Oran Brigham, President
Donald Smith, Director of Sales
A. William LeDoux, Product Manager

Founded: 1965

PRODUCTS:
LNA/Downconverters, LNCs, power block/DC couplers, line drive amplifiers, power dividers, duplexers.

Avcom of Virginia, Inc.

500 Research Road
Richmond, VA 23236

(804) 794-2500

R. Andrew Hatfield, President
Linda Abshire, Sales Manager

Founded: 1975

PRODUCTS:
Twelve different models of satellite receivers, most popular being the COM-3R, COM-3, COM-2, COM-65, COM-66. Avcom builds 60 dB isolators, power dividers (2-way, 4-way, 8-way), DC power blocks, feedline assemblies, modulators, power actuators.

Basic Systems

1919 South 129 East Avenue
Tulsa, OK 74108

(918) 437-7066

Jim Moon, President
Judy Moon, Advertising

PRODUCTS:
Basic Systems manufactures electronic equipment for the satellite TV industry. Currently available are three models of motorized satellite tracking systems.

Founded: 1981

Birdview Satellite Communications, Inc.

P.O. Box 963
Chanute, KS 66720

(316) 431-0400; (800) 835-0662

Charles (Bud) Ross, President
Bob Summerville, Vice President Sales
Stan Ross, General Sales Manager

PRODUCTS:
Birdview Satellite Communications, Inc. manufactures complete satellite T.V. receiving systems for individual homeowners' use. The Birdview system is composed of a one-piece 9-foot diameter aluminum antenna and all electronic components necessary to produce studio quality pictures. (The components of the systems are matched for optimum performance.)

Founded: 1981

Blonder-Tongue

Jake Brown Rd.
Old Bridge, NJ 08857

(201) 679-4000

Ben H. Tongue, President
Isaac Blonder, Chairman of the Board
Glenn M. Stawicki, National Sales Manager

Founded: 1950

PRODUCTS:
Manufactures TVRO antennas, LNCs, receivers, modulators and related equipment.

Boman Industries

9300 Hall Road
Downey, CA 90241

(213) 869-4041

Robert Maniaci, President
Jeff Contini, Sales Manager
Bill Beavers, Marketing Manager

Founded: 1959

PRODUCTS:
Model SR800 Receiver; Model SR2000 Receiver (Electronic Tuning, Remote Control); Polar-Matic Electronic Feed; Polar Mount; Turnkey Systems. Components sold/recommended: 3.3M Prodelin antenna; Aventec LNA 915; Dexcel LNC's SA3000.

BR Satellite Communications

216-11 Kingsbury Avenue
Bayside, NY 11364

(800) 424-2010

Ben Rose, President
Leon Rose, Vice President

PRODUCTS:
Master distributor for MRI antenna positioners and receivers, California Amplifier and Norsat, LNAs, Chaparral polarotors, Seavy feed systems, Sat-pak jumper cables and coax-seal.

Founded: 1982

Burr Engineering & Development Corp.

730 E. Michigan Avenue
Battle Creek, MI 49016

(616) 965-2371

Jack Budrow, Vice President
Mike Walters, General Sales Manager
Ed Phillips & Dan Budrow, Sales Engineers

Founded: 1959

PRODUCTS:
Linear actuators and controls for TV earth stations.

California Amplifier

3481 Old Conejo Road, Suite A3
Newbury Park, CA 91320

(805) 498-2108

Jacob Inbar, President
Sharon Schmalzried, Sales Manager
Roger Toft, Marketing Manager

California Amplifier

PRODUCTS:
LNAs, LNCs, isolators and power dividers.

Founded: 1981

Channel Master Div. of Avnet

Route 209
Ellenville, NY 12428

(914) 647-5000

Clarence Gobel, Sales Manager
Donald Berg, Vice President Marketing
Richard Deutsch, General Manager

CHANNEL MASTER
SATELLITE RECEPTION EQUIPMENT
DIVISION OF AVNET, INC.,

PRODUCTS:
TV antennas and accessories; MATV and SMATV equipment; satellite equipment, color picture tubes.

Founded: 1949

Chaparral Communications

2343 Bering Drive
San Jose, CA 95131

(408) 262-2536

Bob Taggart, President
Joe Leipzig, Sales & Marketing Mgr.

CHAPARRAL

PRODUCTS:
Polarotor 1 and 2, twister, dual feed, superfeed, 12 GHz feed horns, S band (2.6 GHz) feed horns.

Founded: 1980

Comtech Antenna Corp.

3100 Communications Road
St. Cloud, FL 32769

(305) 892-6111

Pres Windus, President
Glenn Higgins, Sales Manager
Tom Christy, Marketing Manager

Founded: 1976

PRODUCTS:
3.0, 3.8 and 5.0-meter earth stations for home and commercial applications; control units for antennas; 5.0 meter transportable antenna.

Conifer Corp.

P.O. Box 1025
Burlington, IA 52601

(319) 752-3607

John Von Harz, President
Jim Clark, Sales Manager
George Jones, Marketing Manager

Founded: 1976

PRODUCTS:
MDS antennas and downconverters, STV antennas and amplifiers, LPTV reception equipment, ITFS equipment, earth station antennas, feed horns, LNAs and satellite receivers.

Continental Satellite Systems

11485 S.E. Hwy. 212
Clackamas OR 97045

(503) 656-2774; (800) 331-2774

Dan Berge, President
Dave Clark, Sales & Marketing Manager

Continental Satellite Systems

PRODUCTS:
8' silver edition, 12' silver feather aluminum mesh antenna, UPS and air cargo shippable. Strong, yet light weight, ease of construction — great for the do-it-yourselfer. Introducing the all new 16' silver max opening up market areas that up to now closed to the smaller antennas.

Founded: Not available.

Delta Satellite, Inc.

1003 Washington Street
Grafton, WI 53024

(414) 375-1000; (800) 558-5582

Jerry Dubiel, President
Michael Hansen, Sales & Marketing Manager

Founded: 1963

DELTA® SATELLITE CORPORATION

PRODUCTS:
Starduster antenna. Components sold/recommended: KLM, Amplica, Full Line Catalog.

D H Satellite Inc.

P.O. Box 239
Prairie Du Chien, WI 53821

(608) 326-8733

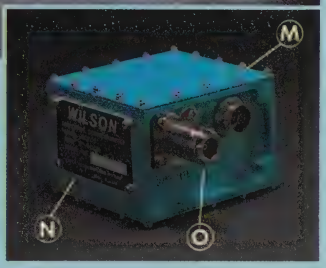
Frank Weeks, President
Michael Doll, Vice President
Donald McCullick, Installation Technician

Founded: 1967

PRODUCTS:
Modular homes, mobile homes, and power drives for antennas.

Details • Details • Details

Wilson YM1000



- **A** Modulator — FCC approved, crystal controlled, VHF Ch. 3-4, switches local TV and satellite signals
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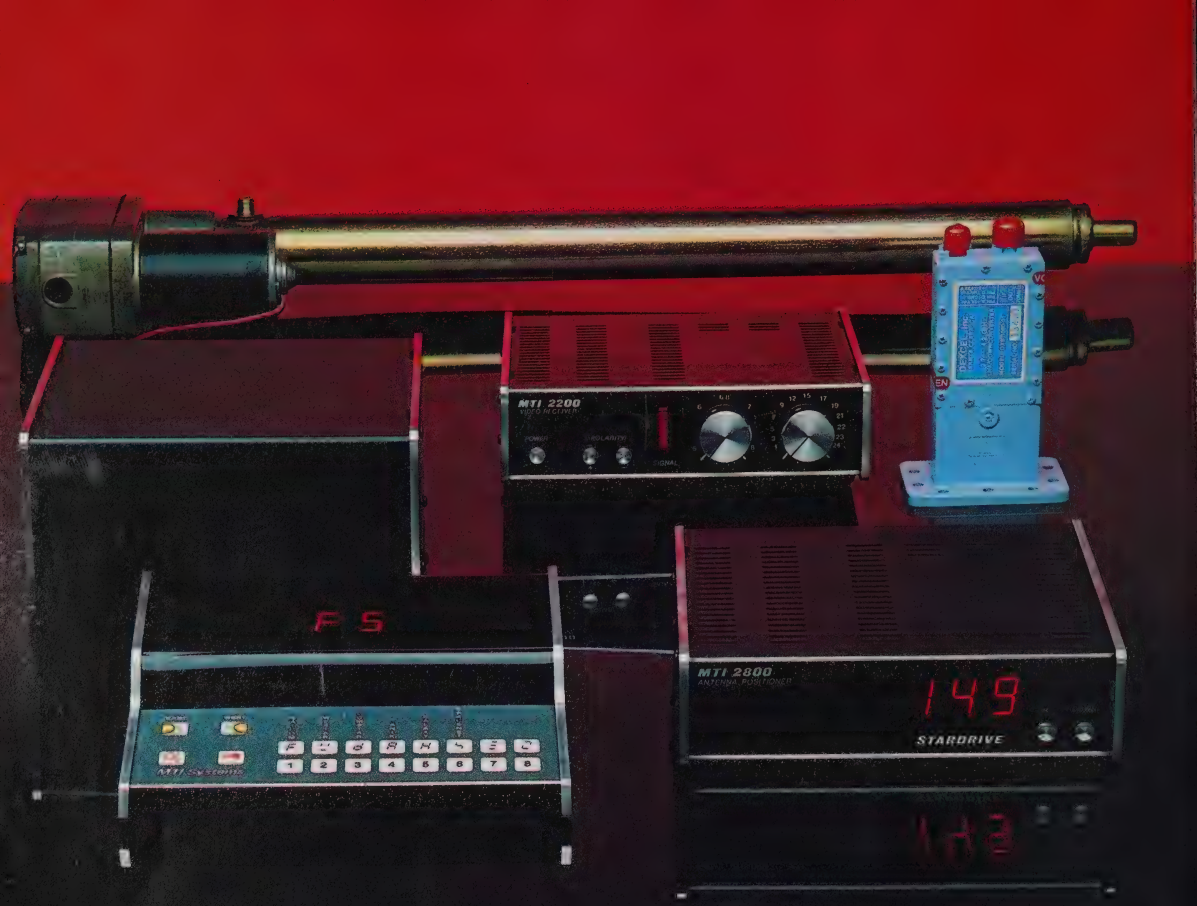
- **C** Individual channel potentiometer for precise channel control
- **D** Tunable Audio
- **E** Main Power resets all functions
- **F** Power off switches satellite off and local antenna on. Memorizes last channel and audio position.
- **G** Receiver FCC approved
- **H** Rugged steel case
- **I** Preset Audio channels
- **J** Fine Tuning Control
- **K** Odd-Even controls polarity
- **L** Volume Control
- **M** Fully weatherproofed housing, connectors, and O ring seals
- **N** Die cast Aluminum housing
- **O** Gold inlaid ceramic substrate image reject mixer

call toll free
800-634-6898
in Nevada call (702) 739-7401

WILSON MICROWAVE SYSTEMS, INC.

4286 S. Polaris Ave. • Las Vegas, NV 89103



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PASADENA, CA 91107
(213) 681-6222

1-800-421-7676
(OUTSIDE CA ONLY)
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9841 MANCHESTER ROAD
ST. LOUIS, MO 63119
(314) 968-6620

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CORPORATION

SELLING THE FINEST SYSTEMS IN THE WORLD

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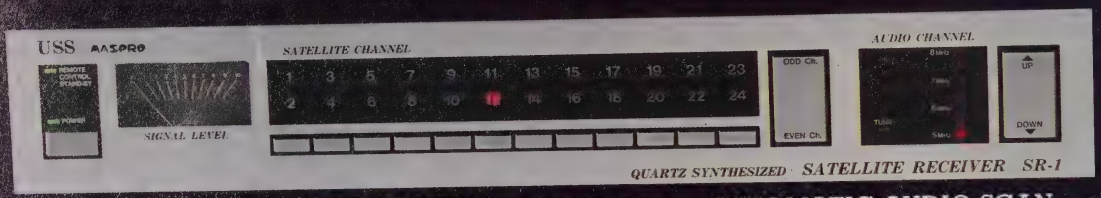
9641 MANCHESTER ROAD
ST. LOUIS, MO 63119
(314) 968-6620

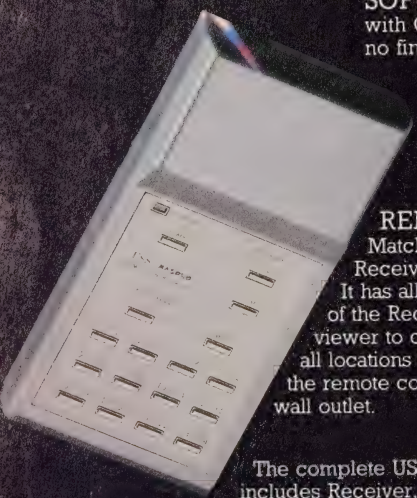
in any field there can only be one FIRST! in satellite receivers WE ARE IT!

compare USS/MASPRO and RSI features



SOFT-TOUCH - one button tuning with Quartz-synthesized encoder; no fine tuning required.

AUTOMATIC AUDIO SCAN - allows scanning of all audio sub-carriers from 5MHZ to 8MHZ.



REMOTE CONTROL
Matched with the USS/MASPRO Receiver is the Remote Control. It has all of the front panel functions of the Receiver and permits the viewer to control the receiver from all locations in the home. Just plug the remote control into any 110V wall outlet.

The complete USS/MASPRO SR-1 System includes Receiver, Remote Control, LNC, 2nd Down Converter and all cables for 120 feet run to your home.

Dealer & Distributor Inquiries Welcome

USS/MASPRO satellite television products are distributed by Recreational Sports and Imports, Inc. RSI is committed to Quality products at competitive prices, and we guarantee product availability and fast delivery. RSI dealers receive advertising and sales aids, quality service and financial assistance. We are the Master Wholesale Distributor known for honesty and dependability —since 1967.

RSI also features:

MTI Products
- Receivers
- Antenna Positioners

ANTENNAS
- Jensen • Prodel
- Regency

RECEIVERS
• Dexcel • KLM • Janiel • SAT-TEC • Gillesp

RSI

RECREATIONAL SPORTS & IMPORTS, INC.
2436 North Woodruff Ave.
Idaho Falls, Idaho 83401
(208) 523-5721

DX Communications, Inc.

A subsidiary of C. Itoh & Co. (America) Inc.
116 Midland Avenue
Portchester, N.Y. 10573
(914) 939-8880

Hiro Sugiyama, Executive Vice President
Koki Matsumoto, Sales Manager
Aki Yuasa, Marketing Manager

PRODUCTS:

4 GHz block downconversion satellite receiver; 12 GHz low noise converter and receiver.

Founded: 1947

Earth Terminals

One Microwave Plaza
Cincinnati, OH 45242

(513) 489-6200

James Jaeger, President
Bill Gaible, Sales & Marketing Manager

PRODUCTS:

Earth Terminals offers a satellite receiver with professional video quality and simplicity of operation. The unit includes a remote control and dual-conversion remote down-converter.

Founded: 1980

Echosphere Corp.

2250 S. Raritan, Bldg. A
Englewood, CO 80110

(303) 935-1909

Charlie Ergen, President
Candy Ergen, Vice President

PRODUCTS:

ADM, Arunta, Automation Techniques, Avcom, Blonder-Tongue, California Amplifier, Chaparral, Crescomm, DH Antennas, Danex, DX Receivers, Dexcel, Drake, Houston Satellite, Janeil, KLM, Luly, Luxor, MTI, Norsat Tweaker, Power Consultants, Prodelin, Satellite Ground Components, Sat-Tec, Transifier, UHF Associates, Vector Systems, Wilson.

Founded: 1980

Gardiner Communications

3605 Security Street
Garland, TX 75042

(214) 348-4747

Jim Harris, President
Howard Freeland, Sales Manager
Bob Kuopus, Marketing Manager

PRODUCTS:

Satellite receivers, modulators, antennas, processors, time and tone switching, pre-package headends along with ancillary equipment for one-step headend needs.

Founded: 1979

General Instrument Corp.

RF Systems Division
1 Taco Street
Sherburne, NY 13460
(607) 674-2211/(800) 847-0721

A.F. Potter, President
S. Chawla, Sales Manager
G. Roman, Marketing Manager

Founded: 1934

PRODUCTS:

Complete consumer and SMATV satellite TV reception systems, 8, 10, 12 and 15-foot dish antennas, 24-channel microprocessor agile receivers with and without handheld remote control. Complete system design service provided.

Gillaspie Communications

365 San Aleso Avenue
Sunnyvale, CA 94086

(408) 730-2500

Dr. Pang T. Ho, President
James C. Johnston, Vice President Marketing

PRODUCTS:
Manufacturers of satellite receivers for the consumer and SMATV. Gillaspie also makes 4-GHz line amplifier and a 4-GHz isolator. Other items include a 6-foot antenna system and a battery-operated earth station.

Founded: 1979

Gould/Dexcel Div.

2285-C Martin Avenue
Santa Clara, CA 95050

(408) 727-9833

Vernie Brown, President
Gary Mezzatesta, Sales Manager
John Applegate, Vice President Sat. Comm. Prod.
Are Kawai, TVRO Division

PRODUCTS:
1100-series receiver; LNA, LNC, downconverters and line amplifiers, LNB and commercial receivers.

Founded: 1977

H & R Satellite

Rt. 3, Box 103G
Pocahontas, AR 72455

(501) 647-2291; (800) 643-0120

John Hastings, President

Founded: 1980

PRODUCTS:
Manufactures complete satellite TVRO systems, including from eight to 20-foot antennas and consumer and commercial grade receivers.

Harris Corporation

P.O. Box 1700
Melbourne, FL 32901
(305) 724-3537

J.T. Hartgey, President
Jerry Porter, Sales Manager
Raymond W. Pawley, Director of Marketing

Founded: 1971

PRODUCTS:
Complete line of satellite earth stations, featuring 6.1, 9 and 11 meter models. Uplink and downlink antennas, video receivers and other satellite products.

Hastings Antenna

847 West 1st Street
Hastings, NE 68901

(402) 463-3598

Dale Curtis, President
Joe Anderson, Marketing Manager
Luana Morrow, Sales Manager

Founded: 1980

PRODUCTS:
Antenna manufacturers, LNA and receiver distributor.

Channel Master

...quality systems from a consumer-recognized industry leader...at a price that's easy to sell.

Your local Channel Master distributor invites you to join the Channel Master selling team. He's ready right now with dependable, quality equipment at a price that brings the cost of satellite reception down to earth for thousands of new sales prospects.

If you thought selling satellite was beyond your limits, take a look at what your Channel Master distributor can do for you:

- He's your personal local warehouse. You buy equipment only after you have it sold. There's no need to invest in systems "up front."
- If you're new to satellite, your Channel Master distributor has people who can help you from start to finish, from sales techniques to in-ground installations.
- His Channel Master equipment is state-of-the-art, backed by the strongest and most convenient warranty in the industry.

Channel Master has been in the TV reception business since 1949, and our name has the best consumer recognition in the field. As part of billion dollar electronics concern, you can rest assured that we'll be here to stand behind you and our product for the useful life of the earth station.

SPACE
The Voice of the Satellite Earth Station Industry

Left to right above:

The Channel Master **Satellite Receiver** is built to commercial performance standards and designed to provide the viewer with complete audio and video control. Add the optional **SATSCAN™ motorized dish control** and you have a full feature system that will satisfy your most discriminating customers.

Channel Master®

Phyllis Fisher
Channel Master Division of Avnet, Inc.
CGC84, Ellenville, New York 12428 (914) 647-5000

Tell me more about the CM Satellite Sales System

NAME _____

BUSINESS _____

ADDRESS _____

CITY _____ STATE _____

ZIP _____

PHONE ( ) _____

Please check one ☐ Consumer ☐ Dealer

Hawkeye Satellite Division

15445 Metcalf Avenue
Stanley, KS 66223

(913) 681-8250

Lewis Baker, President
Larry Kuesser, Sales Manager
Jack Golldner, Marketing Manager

Founded: 1946

PRODUCTS:
Manufacturer of satellite antennas and mounts.

Hero Communications

2470 W. 8th Avenue
Hialeah, FL 33010

(305) 887-3203

Robert Behar, President
Gary Willhoite, Sales Manager
Estrella Behar, Marketing Manager

Founded: 1977

PRODUCTS:
Broadcast-quality aluminum antennas with a horizon polar mount in the following sizes: 10, 13, 20, 25 and 32-foot. Digital remote control units and single channel per-carrier receivers for international installations. Sold/ recommended: California Amplifiers, Avcom, Chaparral, Arunta.

High Frontier Distribution

1445 W. 12th Place
Tempe, AZ 85281

(602) 966-9824

Richard Desman, President
Larry Holden, General Manager, NW office
Peter Foti, Sales Manager

PRODUCTS:
Wholesale distributor for all TVRO components.

Founded: 1981

Houston Satellite Systems, Inc.

8000 Harwin #397
Houston, TX 77036

(713) 784-8953

Mike Krehel, President
Pam Longnion, Sales Manager
Dave Beck, Marketing Manager
Founded: 1980

PRODUCTS:
Tracker III—A programmable unit with memory for up to 70 different satellites. Unit provides: programmable LNA rotation, automatic overshoot correction with limited end stops, pre-programmed error codes for malfunctions.
Tracker I—A relative readout unit which indicates position from side of the arc to the other, has fast or slow position. This unit also has a polarotor drive system that allows for skew across the arc.

ICM Video Co.

P.O. Box 26330
Oklahoma City, OK 73012

(405) 236-3741

Royden Freeland, President
Mike Janko, Marketing Manager

Founded: 1950

PRODUCTS:
Satellite receivers.

THE STRONG SILENT TYPE.

California Amplifier. Remember that name, because we've decided to speak up for a quiet performer. Our LNA's.

We'll match our noise and gain figures with anybody under any conditions. And when it comes to tough weather from old Mother nature, this is one LNA that can take it without talking back.

There's a good reason we think we have the best. To us, LNA's and the TVRO industry isn't a sideline. To us, it's a living.

California Amplifier

California Amplifier Inc. 3481 Old Conejo Rd., Newbury Park, CA 91320. (805) 498-2108, (805) 499-8535, TLX 469193

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OF DARKNESS

Now one dish
eclipses all the rest.
Janeil's new Dark Star.™
Its revolutionary design
is a state-of-the-art triumph
leaving other dish manufacturers
in a state of shock.
For you, the Dark Star's combination
of quality, technology and price
is power on a cosmic scale.
This is the first satellite dish constructed
of high-tech, weatherproof plastics and
polycoated aluminum screen.
Shipping is lightweight. Assembly and
installation is supernaturally easy. Reception is laser
sharp with injection molded durability and accuracy.
And its appearance outshines
everything. Your choice of 10′ or 12′.
Janeil's new Dark Star.™
The power is yours.

DARK STAR™ BY JANEIL

Arizona, Hi Frontier, 2230 East Indian School Road, Phoenix, AZ 85106 (800) 382-0395; **California**, Echosphere, 5671 Warehouse Way, Sacramento, CA 95826 (800) 338-5478; **Colorado**, Echosphere, 2250 South Raritan #A, Englewood, CO 80110 (800) 521-9282; **Montana**, A.V. Electronics Marketing, 4301 North Star Blvd., Great Falls, MT 59401 (800) 332-9934; **New York**, National Satellite Communications, Plaza 7, Latham NY 12110 (800) 833-4485; **Oregon**, Total Television, Inc., 17537 N. Umpqua Highway, Roseburg, Oregon 97470 (503) 496-3583; **South Carolina**, Quarles Electric Supply, Inc., 1616 Calhoun Rd., Greenwood, SC 29646 (800) 922-9704 (SC) (800) 845-6952 (National); **Tennessee**, Lewis Electronics, P.O. Box 100, West Elm St., Humbolt, TN 38343 (901) 784-2191; **Texas**, Star-Com, 2205 W. Division #C9, Arlington, TX 76012 (800) 592-1476 (TX) (800) 351-1426 (National); Star-Com, 511 Gregg St., Big Springs, TX 79720 (800) 592-1476 (TX) (800) 351-1426 (National); **Washington**, Hi Frontier, 976 Industry Drive, Seattle, WA 98188 (800) 424-4011; **Canada**, C.S.E. Satellite Equipment Inc., P.O. Box 1060, Brownsburg, Que. J0V 1A0 (514) 533-5470; C.A.L.E. Communications Inc., 693 Henderson Drive, Regina, Sask., Canada S4N 6A8 (306) 949-9181.

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Precision Expanded Metal for High Performanc Parabolic Satellite Dishes

- Specially Engineered Expanded Metal to Maximize Antenna Gain.
- Produced in custom designs that will accurately match the parabolic contours of your TVRO dish.
- Any shape petal required (either die cut for high volume or laser cut using computer-controlled, optical tooling) is supplied at the lowest possible cost.
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PIONEER MEMBER OF SPACE

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CALL TOLL-FREE
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(In Illinois: 1-312-362-8300)

Box 399, 1530 Artaius Parkway, Libertyville, Illinois 60048 (Chicago Suburb)

Intersat Corp.

Two Hood Drive
St. Peters, MO 63376

(314) 278-2178; (800) 325-6122

Don McLaughlin, President
Guy Davis, Vice President Sales
David McClaskey, Vice President Marketing

PRODUCTS:

1Q-160 receiver; SR-10: single or dual conversion, variable tuning, scan-invert, variable audio & video tuning with remote control; SR-20: single and dual conversion (runs up to 2,000 feet) with detente tuning, single-strength meter, full remote; SRDC-4: commercial quality, detente, rack handles, variable & fixed audio, 7.5 threshold. Intersat also builds a stereo matrix decoder; ParaSquare antenna with pole, polar mount & button-hook, modulators. Components Sold/Recommended: Avantek, Birdbrain actuators, Hastings, ADM & IVC antennas.

Founded: 1979

Janeil Corp..

6860 Canby Avenue, Suite 113
Reseda, CA 91335

(213) 881-4155

Dennis Dushane, President
Robert Dushane, Sales & Marketing Manager

PRODUCTS:

Polymer-coated screen 10- and 13-foot antennas and mounts (motorized and manual); Computer antenna tracking equipment. Solid 12-foot, rear feed, 12 petal dish. All dishes available in front and rear feed. Components sold/recommended: Chaparral polarotor; Dexcel 1100 LNC receiver.

Founded: 1981

KLM Electronics, Inc.

P.O. Box 816
Morgan Hill, CA 95037

(408) 779-7363; (800) 538-2140

Peter J. Dalton, President
E. Gracey, Marketing Manager

PRODUCTS:

Satellite receivers, dish antennas, amateur antennas, commercial antennas, military antennas, commercial R.F. amplifiers, line amplifiers.

Founded: 1970

Kaul-Tronics, Inc.

Route 1, Box 292
Lone Rock, WI 53556

(608) 583-4833

John Kaul, President
Jim Atkinson, General Sales Manager
Donn Smart, Commercial Sales Manager
Joe Koelsch, Marketing Manager

PRODUCTS:

Nova 4-meter, two-piece fiberglass antenna with optional extender panels; four-piece 10 and 13-foot round fiberglass antenna; stainless steel pressed 90" & 112" antenna; mount systems; distributors-electronics; commercial, SMATV, CATV, LPTV.

Founded: 1979

Laux Communications Inc.

4460 South Lake Forrest Drive, Suite 218
Cincinnati, OH 45242

(513) 733-1500

Chris McCleary, President
Marwan Nusair, Senior Vice President
J.P. Laux, Executive Vice President
Augustine A. Long, Commercial Sales Manager
David Carr, Consumer Sales Manager

Founded: 1981

PRODUCTS:
The Beta Series, antennas and antenna positioners, boot terminals to cover antenna jack, and LNA's.

Lewis Electronics

P.O. Box 100
Humboldt, TN 38343

(901) 784-5070

Austin Lewis, President

Founded: Not available.

PRODUCTS:
Complete systems.

Lindsay Specialty Products

50 Mary Street W.
Lindsay, Ontario, Canada K9V 4S7

(705) 324-2196

U.S. Division (Jerry Cohen)
477 E. Willow St., Williamsport, PA 17701
(717) 326-7133

John Thomas, President
Bob Barkwell, Sales Manager
Dave Atman, Marketing Manager

Founded: 1953

PRODUCTS:
Manufactures 10, 12, 15-foot rugged aluminum sectionalized dishes available with tripod polar, single pole azimuth elevation mounts. Also carries a complete line of electronics and is able to supply a variety of earth station systems.

Long's Electronics

2700 Crestwood Blvd.
Birmingham, AL 35202

(205) 956-6767;

Jim Long, President
Randy Butts, Marketing Manager

Founded: Not available.

PRODUCTS:
Amplica, KLM.

Lowrance Electronics

12000 E. Skelly Drive
Tulsa, OK 74128

(918) 437-6881; (800) 331-4105

Darrell Lowrance, President
Michael Render, Sales Manager
Howard Yeilding, Marketing Manager

PRODUCTS:
Satellite Receivers with and without stereo decoding.

Founded: 1957

LSI Technologies

340A West Trinity Lane
Nashville, TN 37207

(615) 226-0644

Barry L. Seay, President

Founded: 1981

PRODUCTS:
DL-121 Micro Line receiver, DL-121C Micro Line receiver; Microtracker.

Luly Telecommunications

P.O. Box 2311
San Bernardino, CA 92406
(714) 888-7525

Bob Luly, President
Randy Carlton, Sales & Marketing Manager

Founded: 1977

PRODUCTS:
Four different sizes of lightweight, deployable antenna (6, 8, 10 & 12-foot); a portable silver-coated nylon-fabric antenna (for example, the 12-foot dish weighs only 22 pounds); Luly also builds an electronic polarizor (selects polarity with no moving parts).

Luxor STS

2310-12 Millpark Drive
Maryland Heights, MO 63043
314 423-6564
Jim Rothbarth, President
Founded: 1981

PRODUCTS:
High-Performance 4GHz Receiver.

M/A-COM/Home Group

Box 100
Claremont, NC 28610

(704) 459-9762; (800) 438-9706

George Gilbert, Sales Manager
Harry Matthews, Bruce Loyer, Marketing Managers

PRODUCTS:
3.0, 3.8 and 5.0-meter earth stations for home and commercial applications.

Founded: 1950

Prodelin

M/A-COM, MAEC Inc.

3135 Universal Drive
Mississauga, Ontario
Canada L4X 2E7

(416) 625-4605

Brian Dinsdale, Manager

Founded: 1950

PRODUCTS:
M/A-COM operates 22 subsidiaries, four of which are the satellite/cable business. M/A-COM, MAEC builds low noise amplifiers.

M/A-COM Video Satellite, Inc.

63 Third Avenue, Bldg. 5
Burlington, MA 01803

(617) 272-3100

Richard Di Bona, President
J. Duke Brown, Sales Manager
Mel Field, Components Marketing Manager

PRODUCTS:
7.2 & 9-meter antennas, earth stations to studio, transmitter, fiber-optics links, back haul systems, high quality frequency agile broadcast receivers and computerized remote controllers and program schedulers.

Founded: 1950

McCullough Satellite Equipment

Route 5, Box 97
Salem, AR 72576

(501) 895-3167; 895-3318

John McCullough, President
Brenda Smith, Sales Manager
Mary McCullough, Marketing Manager

Founded: 1980

PRODUCTS:
Antennas; 8, 10, 16 and 20-foot screen spherical (8-ball antenna); wooden lattice-work with screen surface. Fixed and agile mounts for 8 & 10-foot dishes. Components sold/recommended: McCullough receiver, McCullough modulators; Amplica & California Amp LNA's; Electronic rotors.

Metalex Corporation

1530 Artaius Parkway; Box 399
Libertyville, IL 60048

(800) 323-0792; In IL: (312) 362-8300

Len Sandberg, President, Marketing Manager
Mark Stone, Chief Engineer
Stanley Mandeltort, Manufacturing Manager

Founded: 1961

PRODUCTS:
Expanded and perforated metal for high performance satellite dishes. Rolls, sheets and cut-to-size drawn or flat blanks. (Sold exclusively to manufacturers.)

Microdyne Corp.

P.O. Box 7213
Ocala, FL 32672

(904) 687-4633

Lewis H. Wolcott, President
David Alvarez, Director of Marketing
Earl Currier, Marketing Manager

Founded: 1968

PRODUCTS:
Manufactures Satellite TV receivers, horn antennas, modulators, associated hardware and provides services and materials for earth stations and home terminals.

Microwave Applications Co.

3030 Industrial Pkwy.
Santa Maria, CA 93455

(805) 928-5711

C.R. Boyd, President
David W. Prigge, Sales & Marketing Mgr.

PRODUCTS:
Ferrite Polarization Rotator used for electronically selecting the polarization of signals received by
a dual-polarization antenna feed used in TVRO systems.

Founded: 1969

Microwave Filter Co., Inc.

6743 Kinne Street
East Syracuse, NY 13057

(315) 437-3953; (800) 448-1666

Glyn Bostick, President
Emily Bostick, Sales & Marketing Manager

Founded: 1967

PRODUCTS:
Bandpass filters, lo-pass and hi-pass filters, pay-TV traps and filters, special purpose networks, general purpose traps.

Miralite Corp.

1331 E. St. Gertrude
Santa Ana, CA 92705

(714) 641-7000

Fred Fourcher, President

Founded: 1980

PRODUCTS:
3.7 meter fiberglass/honeycomb composite earth station antennas, remote computer control console azimuth drive system. 2.4-meter KU & C-band, and multi-sat (dual or triple) antenna.

EARTH STATION RECEIVER

REMOTE CONTROL

ESR240 INFRARED REMOTE CONTROL RECEIVER

In the Drake tradition. . . The ESR240 infrared remote control earth station receiver incorporates the latest technical innovations and built-in features while continuing time-honored Drake styling and impeccable workmanship. The ESR240's standard features set it apart from all the others: • Infrared remote control • Attractive styling • Digital LED display • Touch "memory" switches with LED indicators • Fixed and variable audio tuning for all subcarriers • Channel "scan" function • Crystal-controlled modulator — Channel 3/4 • Full metering • Automatic TV/Satellite antenna switching • Polarotor™ I interface with format indicator • Electronic polarity adjustment.

Add the performance and remote control versatility of the ESR240 to your satellite earth station. The Drake ESR240 will be the standard of excellence for years to come. Demand a Drake!

Polarotor™ is a trademark of Chaparral Communications, Inc.

See your local Drake dealer or contact us for further information.

R. L. DRAKE COMPANY

DRAKE®

540 Richard St., Miamisburg, Ohio 45342 USA
Phone: (513) 866-2421
Telex: 288017

PIONEER MEMBER OF SPACE

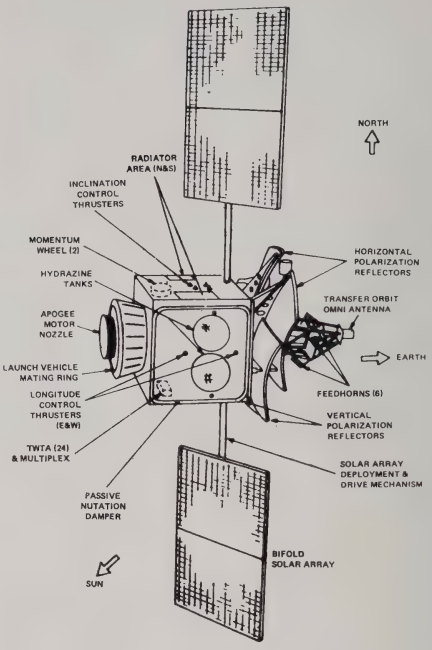
Cont'd from page 6

Satellites: History of Satellite Technology

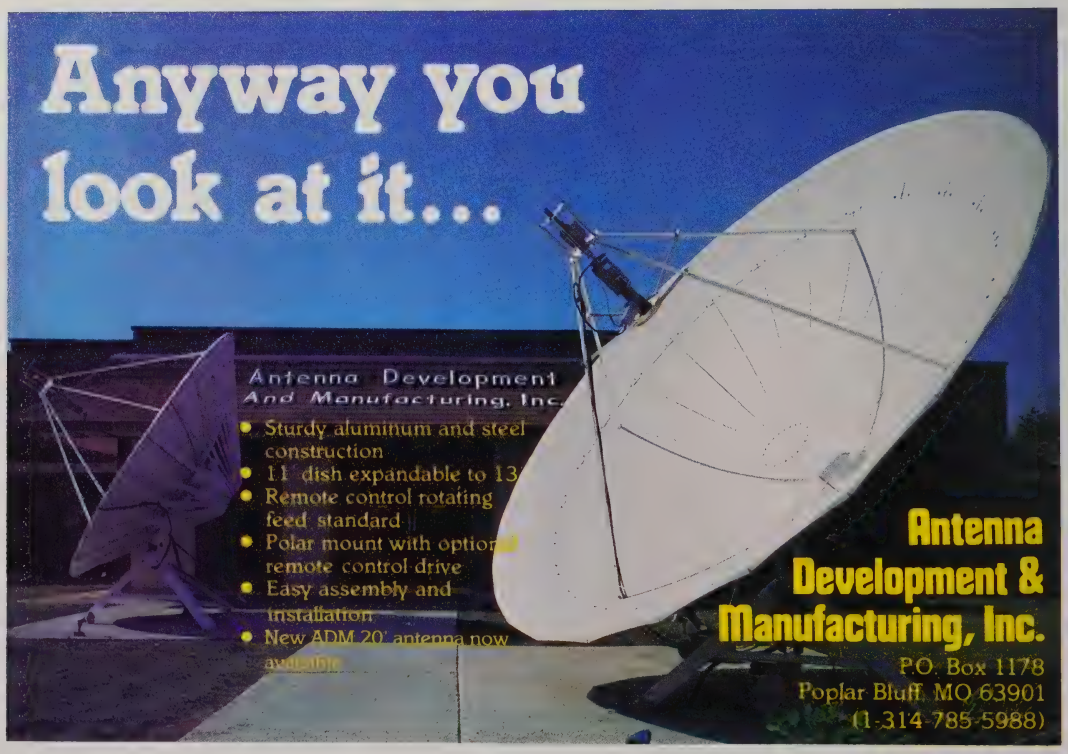
The Canadians also launched three of their own domestic ANIK birds, and these, together with the INTELSAT international satellites, meant that by the end of the seventies, over 20 communications satellites had been put into space to carry domestic and overseas television feeds. However, the major television networks were cautious about using this new satellite technology to relay their programs. Bell's microwave network was expensive, but it was also absolutely reliable.

The rebirth of the cable television industry in the seventies was soon to change all that. Although community-antenna television (CATV) systems had been around since the early fifties, it wasn't until the mid-1970s that enough cities and towns had been wired for cable for it to make a significant impact. By then the new communications satellites had been launched, and several innovative programmers such as Home Box Office (HBO) hit upon the idea of using the satellites to feed their pay TV first-run-movies service directly to the CATV companies via satellite, thus eliminating the need to "bicycle" tapes and films around the country via the U.S. mails.

Distribution was far cheaper by satellite. One satellite channel or transponder rented for about $1 million per year, or just about 1 percent of the cost of the TV networks' terrestrial microwave cost. Because of its low delivery cost, HBO could keep its pay TV prices down, and millions of viewers quickly signed up through their local CATV systems to take the HBO movie service. Other television programmers were soon to follow.



Component locations on RCA Satcom 3 Satellite.
(Courtesy RCA America Communications, Inc.)



MTI Systems

2335 South 2300 West
Salt Lake City, UT 84119

(801) 972-4819

Royal Lamb, President

PRODUCTS:
Programmable antenna positioners.

Founded: 1981

PenTec
MTI Systems Proudly Created in the U.S.A.

National Microdynamics

5153 Airways Boulevard
Chattanooga, TN 37421

(800) 845-0813

Walter Bowen, President

PRODUCTS:
Complete Systems.

Founded: Not available.

National MICRO-DYNAMICS INC.

National Microtech, Inc.

P.O. Drawer E
Grenada, MS 38901

(601) 226-8432

Larry Ward, President
Ken Brown, Sales Manager
Bill Stark, Marketing Manager

Founded: Not available.

PRODUCTS:
Apollo polar mounts, polar post mounts, three-meter expanded metal antennas, feed assemblies, Apollo X-1 Lift, Apollo X-10 - 10-foot M/A Com Prodelin, 7.5-foot stainless steel, Apollo X-7 programmable lift. Sold/recommended: Apollo S-70 stereo processors, X-1, X-5 and X-7 lifts, Sat-tec stereo processor Z70, indicator lift controls.

National Satellite Communication

Plaza 7
Latham, NY 12110

(800) 833-4485

D. Jim DiDonato, President
Sally DiNonato, Vice President
Jack Hanna, National Sales Manager

PRODUCTS:
Master distributors for ADM, Avantek, Avcom, Chaparral, Drake, Houston Tracker and Janeil.

Founded: Not available.

NSC

Newton Electronics, Inc.

2218 Old Mayfield Way #1
Mountain View, CA 94043

(415) 967-1473

Taylor Howard, President
Paul Delmonico, C.E.O.

Founded: 1981

PRODUCTS:
TVRO signal/pattern generators, TVRO downconverters, TVRO Hybrid ICs.

Norsat Systems

#205-19425 Langley Bypass
Surrey, B.C. Canada V3S 6K1

(604) 533-4371

Rod Wheeler, President
Mike Stevens, Vice President Marketing

Founded: 1977

PRODUCTS:
Receivers, Industrial Modular Systems, complete satellite reception systems.

Odom Antennas, Inc.

1st State Bank, Suite 202
Beebe, AR 72012

(501) 882-6485

Bob Mullenax, President
Bill Thornton, Sales & Marketing Manager

PRODUCTS:
Antennas: 8, 10, 13, 16 and 20-foot. Odom also manufactures mounts.

Founded: 1979

Paradigm Manufacturing

6911 Eastside Road
Redding, CA 96001

(916) 244-9300

David P. Johnson, President
Max Schreiber, Sales Manager
Bruce Merrill, Special Account Marketing Manager

PRODUCTS:
Expanded aluminum mesh antenna; welded aluminum truss construction; single pole, polar mount with declination adjustment and weatherproof downconverter enclosure; Shepard's cane prime focus, LNA motorized-mount with Chaparral superfeed. Paradigm also builds the PARADRIVE 1 motor drive system. Components sold/recommended: Drake ESR-24, GLR-550, Avcom Con-2, KLM-4, Avantek and Amplica LNA's.

Founded: 1980

Patmar Technologies, Inc.

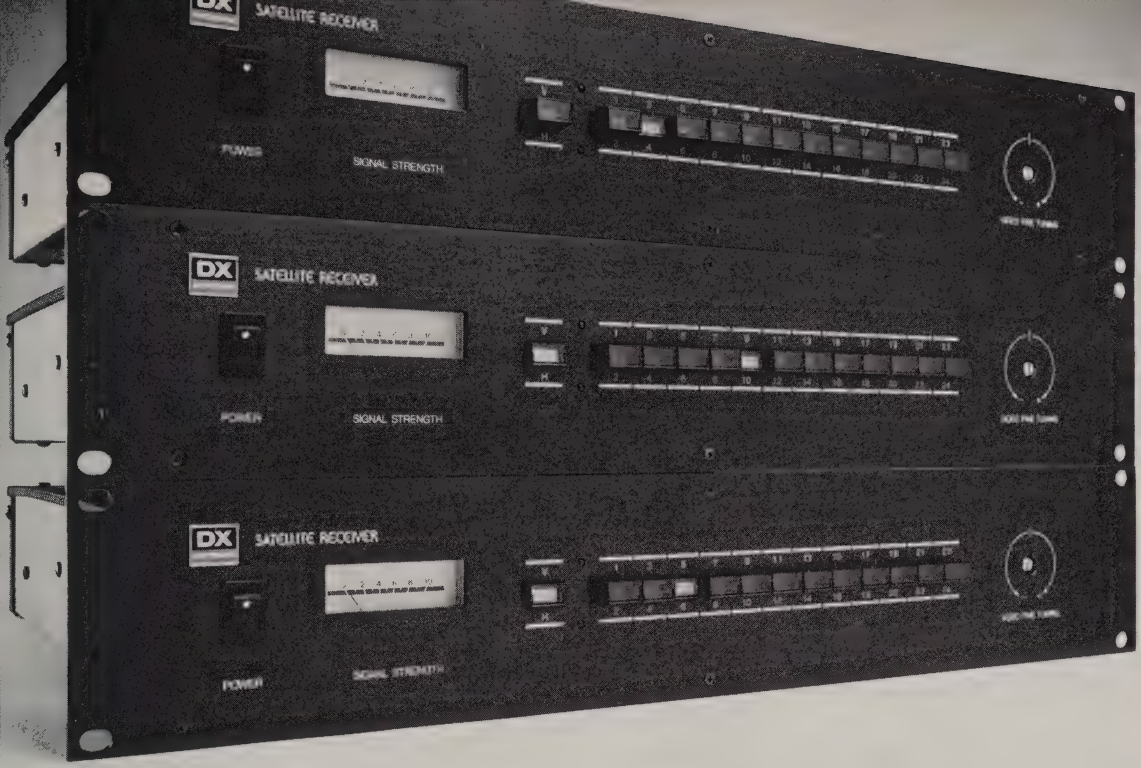
6 Claremont Road
Bernardsville, NJ 07924

(201) 766-4408

Peter Sutro, President
Bill Heavener, Vice President

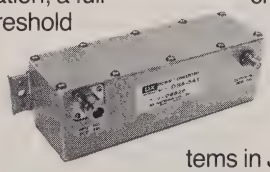
PRODUCTS:
Distributor of Harris Corp. equipment, DX antennas, Paraclipse antennas, Intersat, Locom, Blonder-Tongue equipment and more.

Founded: 1981



DX Gives You Big System Quality at Small System Prices.

Now you can have top quality performance for a surprisingly reasonable price. The DSA-643 Satellite Receiver from DX features **dual block downconversion**—unique for receivers in this price range. The DSA-643 uses a discriminator circuit for signal demodulation; a full 30 MHz bandwidth; and a unique threshold extension circuit. These features add up to a low threshold carrier to noise ratio, commercial quality reception and low cost installation in any system.



DX also provides the DSA-541 Block Downconverter. It features a highly stable ceramic resonator, with a fixed frequency of 2800 MHz. Stability is maintained at a remarkable ±1 MHz over the entire −30° to +50°C temperature range. So you can install the downconverter out of doors, at the dish, without concern for frequency drift caused by temperature changes year after year.

The innovative DSA-643 Satellite Receiver and DSA-541 Block Downconverter are brought to you by DX, one of the most respected names in satellite television reception systems in Japan and around the world. DX also provides line amplifiers, power dividers, and other block downconversion-compatible accessories.

DX
ANTENNA

DX Communications, Inc., A Subsidiary of C. Itoh & Co. (America) Inc.,
116 Midland Ave., Portchester, N.Y. 10573 (914) 939-8880
Manufactured by DX Antenna Co., Kobe, Japan.

Pico Satellite

415 Gator Drive
Lantana, FL 33462

(305) 588-7356

George Knapp, Interim President
Elmer E. Pegram, Vice President & General Manager

PRODUCTS:
Modulators, single-channel amplifiers, channel converters, walltaps, preamps, and complete headends for TV signal distribution in CATV, SMATV, MDS & STV.

Founded: 1970

Precision Satellite Systems

Rt. 2; Box 117A
Oakley, KS 67748

(913) 672-3247

Darryl Van Kirk, President

Founded: 1982

PRODUCTS:
A 10-foot fiberglass antenna with 6 foot support ring, extra heavy duty mount system with replaceable bearings, Precision Satellite power actuator control system with polorotor control cable assemblies, focal finder (finds focal center of dish). Components sold: distributors for Dexcel receivers, LNC, LNA/Chaparral polarot and feedhorn/large stock of accessories for Satellite TV/Panasonic Modulator/Power dividers, lots more.

Quadralite, Inc.

114 W. Corsicana
Athens, TX 75751

(214) 675-7999

Richard Eye, President
Jerry Moore, Sales Manager

QuadraLite™

PRODUCTS:
4-5 foot Antennas for TVRO and DBS, satellite receivers. Introducing the Q1 receiver.

Founded: 1982

Quantum Associates Inc.

Alpine Airport Road
Alpine, WY 83128

(307) 654-2000

Arnold A. Gaub, President

Founded: 1980

PRODUCTS:
Manufacturers of Quanta Q-7 programmable satellite scanner, and a 52" and 18" stroke, 115-volt motor and an 18" stroke, 36-volt motor.

Radio Semiconductor Inc.

315 Benner Pike
State College, PA 16801

(814) 238-2133

Kingsley Hastings, President

Founded: 1978

RSI Radio Semiconductor, Inc.

PRODUCTS:
Low noise amplifiers: LNA's manufactured under license from Locus, Inc., a major supplier to the satellite communications common carriers. Performance tested on HP8970A.

Regency Satellite Systems

7707 Records Street
Indianapolis, IN 46226

(317) 545-4281

Joseph Boone, President
Steve Crumb, Marketing Manager

Founded: Not available

PRODUCTS:
TVRO satellite system.

R. L. Drake Company

9111 Springboro Pike
Miamisburg, OH 45342

(513) 866-2421

P.W. Drake, President
M.R. Brubaker, TVRO Sales Manager
J. Shafer, Marketing Manager

PRODUCTS:
Satellite TVRO receivers, stereo processor, video selector-ESS-2250, complete system package-LNA's.

Founded: 1942

Satellite America Marketing, Inc.

P.O. Box 552, Highway 8 West
Grenada, MS 38901

(601) 227-1160

David Fedric, President
Horton Townes, Chairman of the Board
Bill Ferguson, Sales Manager

Founded: 1983

PRODUCTS:
Six and nine-foot dishes. Satellite receivers.

Sat-Tec, Inc./Ramsey Electronics

2575 Baird Road
Penfield, NY 14526

(716) 586-3950

John Ramsey, President
Bob Meyers, Sales & Marketing Manager

Founded: 1975

PRODUCTS:
Satellite receivers (single and dual conversion) and associated equipment.

Scientific Atlanta

Box 105027
Atlanta, GA 30248

(404) 925-5308

Sidney Topol, President
Jerry Copeland, Sales Manager
David Chance, Marketing Manager

Founded: 1951

PRODUCTS:
Mini-cable systems including 2.8 and 3.2-meter earth station antennas, model 6650 video receiver, model 6330 modulator, cableflex coaxial cable, model 6501 mini-amplifier, low noise converter, model 6150 signal processor, off-air antennas, CATV security system, four-foot rack for mini-cable headend.

South River Metal Products Co., Inc.

P.O. Box 394
Matawan, NJ 07747

(201) 566-7087

Max Cohn, President
Martin L. Roth, Director of Marketing

Founded: 1946

PRODUCTS:
Specialize in antenna mounts for all kinds of uses. In TVRO: A) Heavy duty model - welded steel, hot-dip galvanized polar mounts, both stand type and pole type mounts accommodate dishes up to 13 feet. B) Economy model - welded steel, rust resistant paint coated polar mounts, both stand type and pole type mounts accommodate dishes up to ten feet. Both models very rugged and wind resistant.

Star Communications

P.O. Box 1287
Big Springs, TX 79720

(800) 351-4426

C.L. Carlisle, President
Pat Porter, Marketing Manager

Founded: Not available.

PRODUCTS:
Master distributors for M/A-COM, Prodelin, Janeil.

Superwinch Inc.

Winch Drive
Putnam, CT 06260

(203) 928-7787

Frank E. Tolsdorf Jr., President
William M. Ryan, Sales & Marketing Mgr.

PRODUCTS:
Manufacturers of Skywalker d.c. electric antenna actuator drive and control system. The unit features a .6 HP motor and planetary transmission, with 123:1 gear ratio. Superwinch has manufactured over 500,000 transmissions of this design.

Founded: 1969

SKYWALKER™
by Superwinch

Symtel Satellite Systems, Inc.

5400 San Mateo NE
Albuquerque, NM 87109

(505) 883-0600

William Barnhart, President
Gary Smethurst, Sales & Marketing Manager

Founded: 1981

PRODUCTS:
Vision 2000 3M & 2.3M Parabolic, high performance, one-piece parabolic; full modified polar mount with precision declination adjustment; microprocessor controlled low-voltage antenna lift with booster relay at antenna. Components sold/recommended: Auto-Techniques 500, 550 & 750; Amplica LNAs; Lowrance 7 & 7XL; Luxor.

Syntronic Instruments

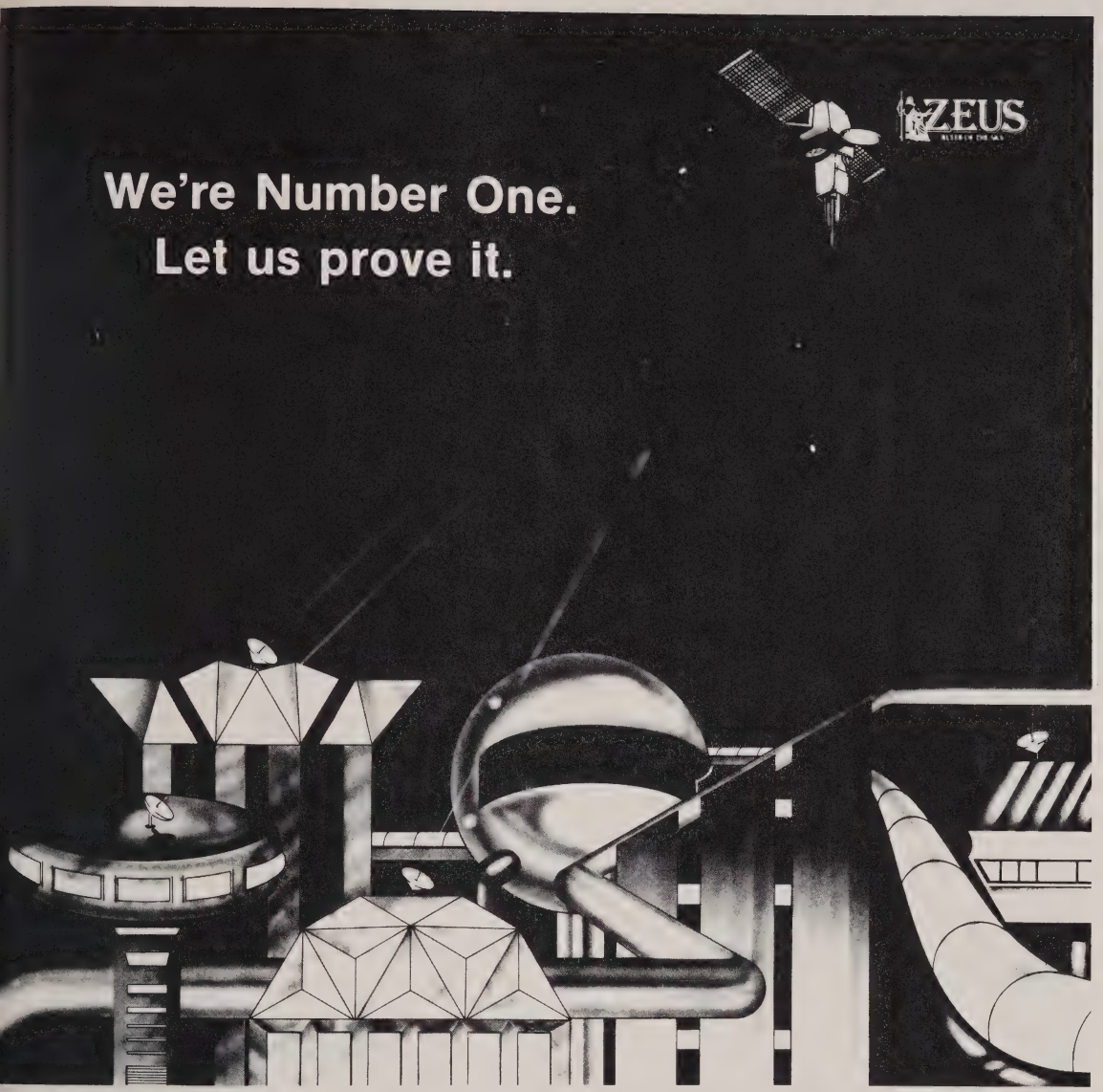
100 Industrial Road
Addison, IL 60101

(312) 543-6444

Marcy Gardener, President
Herb Conrad, LNA Marketing Manager

Founded: Not available.

PRODUCTS:
Deflection yokes and coils, integrated low-noise amplifiers.



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TDF/Hytek

Box 156
Neosho, MO 64850

(417) 451-7404

Larry Ancell, President
Virgil McCoy, Sales & Marketing Manager

Founded: 1981

PRODUCTS:
Actuator control.

Telecom Industries Corp.

27 Bonaventura Drive
San Jose, CA 95134

(408) 262-3100

James R. Bertonis, President
George Klor, Sales Manager
Vincent M. Finelli, Marketing Manager

PRODUCTS:
Satellite television receivers.

Founded: 1980

Tel-Vi

1307 West Lark Ind. Pk.
St. Louis, MO 63026

(314) 343-9977; (800) 325-9967

Richard J. Potts, President
Bill Seller, Vice President Marketing
John Huebner, Sales Service Manager

Founded: 1976

PRODUCTS:
Linear Drive system antenna positioners.

Transtar

1408 Columbia Avenue
Franklin, TN 37064

(615) 794-3672

Thomas S. Tow, President
Phillip Morgan, Vice President

PRODUCTS:
High quality TVRO for home and mini-cable systems, specializing in commercial quality dishes and polar mounts.

Founded: 1980

Tulsat Corp.

1839 North 105 East Avenue
Tulsa, OK 74116
(918) 836-8348
Al McCoy, President

PRODUCTS:
Blonder-Tongue, Basic systems, positioner & receivers, California Amplifier, Odom dishes, Transtar dishes, Automation Techniques.
Founded: 1982

Transvision Corp.

2100 Redwood Highway
Greenbrae, CA 94904

(415) 924-6963

John Edmister, President

Founded: Not available.

PRODUCTS:
Complete TVRO systems.

Triangle Engineering Company

P.O. Drawer 38271
Houston, TX 77238

(713) 445-4251

Preston Buck, President
Carolyn Buck, Sales & Marketing Mgr.

PRODUCTS:
Satellite antennas.

Founded: 1952

United Satellite Systems

Rt. 1
St. Hilaire, MN 56754

(218) 681-5616

Doug Dehnert, President
Richard Anderson, Director of Marketing

Founded: 1979

PRODUCTS:
3.8 and 5-meter fiberglass parabolic antennas with true polar mount; 3.66 meter reaction injection molded antenna; SR-1, USS-Maspro receiver, quartz synthesized, stereo automative polarity switching; automative audio scan, comes with 100%K dual conversion LNA and full-function remote control accessory; Models 370 and 375 power azimuth drives. Components sold/recommended: Model 380 antenna with true polar mount, SR-1 receiver.

U.P. Satellite T.V. & Electronics

2715 Danforth Road
Escanaba, MI 49829

(906) 783-1027

Rick Arbove, Partner
Steve Baird, Partner
Dick Dutton, Partner

Founded: 1983

PRODUCTS:
Mesh antennas.

Vidare, Div. of AFP

P.O. Box Q
Conway, AR 72032

(501) 327-6591; (800) 643-1137

Ernie Avra, President
Don Avra, Sales & Marketing Manager

Founded: 1962

PRODUCTS:
World's largest manufacturer of antennas: 1-meter, 8, 10, 12, 13, 14, 16, and 20-foot dishes; mounts are custom-made locally for Vidare. Components sold: Private label receiver, LSI and Auto-Tech; Recommended: Private Cable trackers, and Chaparral feeds.

Warren Supply

300 East 50th St., North
Sioux Falls, SD 57104

(605) 336-1830

Ron B. Warren, President
Ralph Warren, Vice President
Russ Cramer, Sales Manager

Founded: 1934

PRODUCTS:
Distributors for M/A-COM, Luxor, Drake, Sat-Tech, Intersat.

Wespercom Electronics, Inc.

63393 Nels Anderson Road
Bend, OR 97701
(503) 389-0996
Rod Hoover, President
Cliff Fleury, Chairman of the Board
Eveylyn Kessler, Media Director

Founded: 1979

PRODUCTS:
We manufacture our own motor drive, called the Star Drive. We carry such products as Amplica, M/A-COM, Scientific Atlanta, KLM, Auto Tech, Drake, DX receivers MTI systems and more.

Western Satellite Antenna Inc.

P.O. Box 70
Round Mountain, CA 96084

(916) 337-6203
Timothy Woodruff, President
Larry Woodruff Jr., Sales & Marketing Manager

Founded: 1980

PRODUCTS:
13-foot parabolic dish (FD: .42 ratio, 42.6 gain); 24-foot parabolic, 24 petals. (FD: .41), Both antennas built with polar mount and motorized polar mount. Components sold/recommended: KLM, Avantek, Drake and Panasonic.

Wilson Microwave Systems

4286 S. Polaris Avenue
Las Vegas, NV 89103
(702) 739-1931
Lewis Larsen, President
Jim Wilson, President
Don Williams, Sales Manager
Al Sugira, Marketing Manager

PRODUCTS:
MD11-Satellite antenna, 11 foot steel (12-point system), in single, quarter or 12-piece configuration. New polar mount and new mounting rack for speed and ease of installation.

Founded: 1969

WILSON MICROWAVE SYSTEMS, INC.

Winegard Company

3000 Kirkwood Street
Burlington, IA 52601

(319) 753-0121

John Winegard, President
Robert Fleming, Vice President Marketing
Harry E. Rheinschmidt, Vice President Sales

Founded: 1954

PRODUCTS:
TVRO products and general TV reception/TV distribution systems for home, commercial and SMATV. Offer 24-channel frequency agile receiver, 100-degree LNA block downconverter frequency agile SMATV receiver and modulator, and ten-foot perforated aluminum dish.

WINEGARD® SATELLITE SYSTEMS T.M.

The Unbeatable Picture – The Unbeatable System

The McCullough Satellite System

The McCullough 8 ft. Wagon Wheel decorator antenna with true Polarmount is a deep dish parabolic with beautiful redwood spokes, aluminum see through screen, fully tunable for highest gain; easy to assemble and looks great in any setting.

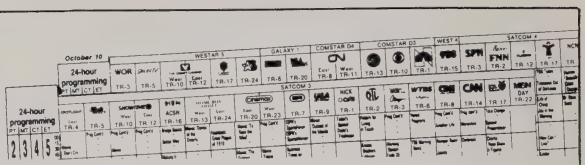
The McCullough ELC-24 receiver has: built in modulator, DC power, scan tuning, tunable audio, signal meter and more.

Combine this with a 100° commercial quality LNA, a polar-matic II feed horn and rotor, plus a 100 foot cable kit.
All for $1265.00
GET THE PICTURE?

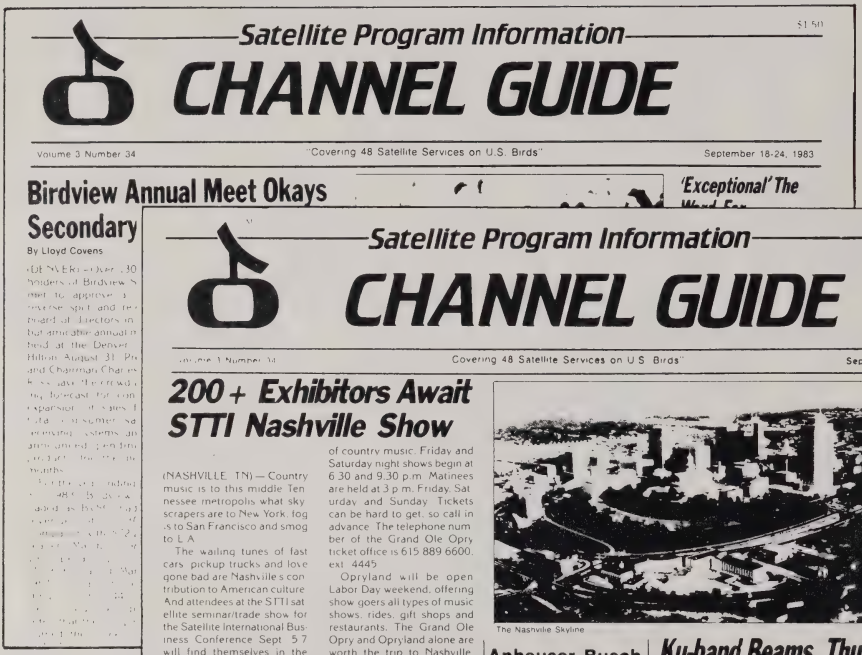
YES! You will get the picture every time with this unbeatable system. Order one today or call John McCullough for complete details on all Private or Commercial TVRO Equipment.

McCULLOUGH SATELLITE EQUIPMENT
Route 5, Box 97
Salem, Arkansas 72576
(501) 895-3167 or (501) 895-3318
Telex 704385

$39 One Year



24 hours a day!, 48 services on 7 birds



Satellite Program Information

CHANNEL GUIDE

$1.50

Volume 3 Number 34 "Covering 48 Satellite Services on U.S. Birds" September 18-24, 1983

Birdview Annual Meet Okays Secondary

By Lloyd Covens

'Exceptional' The

Satellite Program Information

CHANNEL GUIDE

$1.50

Volume 3 Number 34 "Covering 48 Satellite Services on U.S. Birds" September 18-24, 1983

200+ Exhibitors Await STTI Nashville Show

(NASHVILLE, TN) — Country music is to this middle Tennessee metropolis what sky scrapers are to New York, log s to San Francisco and smog to L.A.

The wailing tunes of fast cars, pickup trucks and love gone bad are Nashville's contribution to American culture. And attendees at the STTI satellite seminar/trade show for the Satellite International Business Conference Sept. 5-7 will find themselves in the middle of it all, smack dab in the heart of country music territory.

The 12th STTI trade show of country music, Friday and Saturday night shows begin at 6:30 and 9:30 p.m. Matinees are held at 3 p.m. Friday, Saturday and Sunday. Tickets can be hard to get, so call in advance. The telephone number of the Grand Ole Opry ticket office is 615 889 6600, ext. 4445.

Opryland will be open Labor Day weekend, offering show goers all types of music shows, rides, gift shops and restaurants. The Grand Ole Opry and Opryland alone are worth the trip to Nashville, according to a chamber of commerce spokeswoman. You shouldn't pass them up. Can't get your fill of boozy

The Nashville Skyline

Anheuser-Busch Sports Channel Set For April '84

Ku-band Beams, Thunderstorm Make Mark At SCUC Show

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CHANNEL GUIDE

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Agencies

Federal Communications Commission (FCC)
1919 "M" Street, NW
Washington, D.C. 20554
(202) 254-7674, Ron Lepkowitz

International Telecommunications Union (ITU)
Places des Nations, CH-1211
Geneva, 20 Switzerland
(41-22-99-51-11), Richard Dick

National Aeronautics & Space Administration (NASA)
400 Maryland Ave. NW
Washington, D.C. 20546
(202) 755-2320, Charles Redmond

Trade Associations

Electronic Industries Association
2001 Eye Street NW
Washington, D.C. 20006
(202) 457-4919, Allan D. Schlosser

National Satellite Cable Association (NSCA)
333 North Michigan Ave.
Chicago, IL 60601
(312) 332-3984, Mickey Gorman

National Cable Television Association (NCTA)
1724 Massachusetts Ave. NW
Washington, D.C. 20036
(202) 775-3606, Tom Wheeler

Society for Private & Commercial Earth Stations (SPACE)
1920 N. Street, NW, Suite 510
Washington, D.C. 20036
(202) 887-0605, Richard L. Brown

Publications

The Book Publishing Company
Summertown, TN 38483
(615) 964-3571, Bruce Moore

Channel Guide
300 E. Hampden, Suite 240
Englewood, CO 80110
(303) 761-7930, Lloyd Covens

Coop's Satellite Digest
P.O. Box 100858
Ft. Lauderdale, FL 33310
(305) 771-0505, Bob Cooper

Multichannel News
300 S. Jackson Street
Denver, CO 80209
(303) 393-6397, Thomas Southwick

Phillips Publishing Inc.
7315 Wisconsin Ave., Suite 1200 N
Bethesda, MD 20814
(301) 986-0666, David Williams

Private Cable Magazine
2690 W. Main Street
Littleton, CO 80120
(303) 798-1274, Pat Weisner

Satellite Communications
6430 S. Yosemite Street
Englewood, CO 80111
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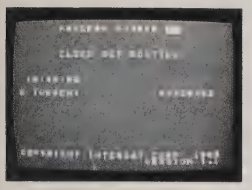

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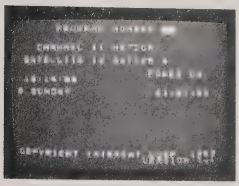
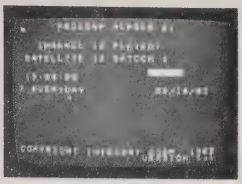
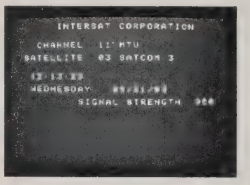


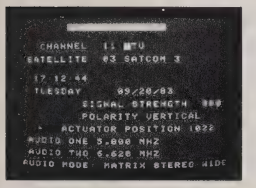
Selects Lockout, Power On, Power Off



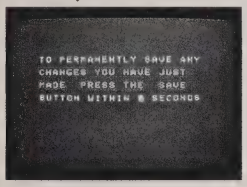
Parental Lockout



Channel #, Satellite, Day, Date, Time



Label Change, Satellite Location, Fine Tunes Audio



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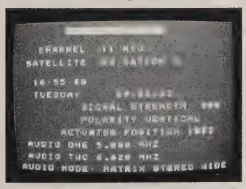

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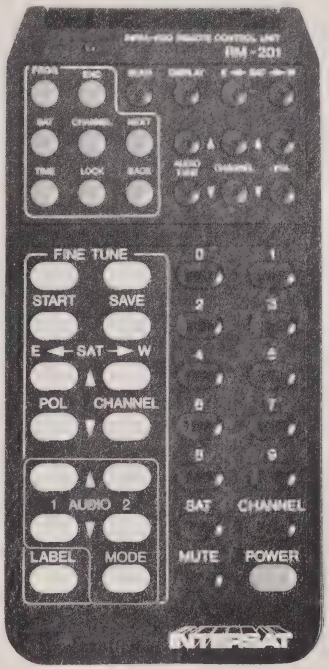

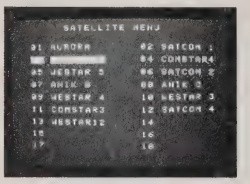

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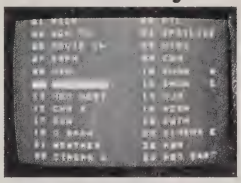
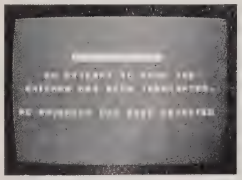


Available Channels On Each Satellite



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(202) 452-1200
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Greenwich, CT 06830
(203) 661-7394
Transponder broker

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New York, NY 10022
(212) 780-8666
Richard Blume
DBS service

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St. Paul, MN 55114
(612) 645-4500
Paul R. Heinerscheid
Proposed DBS common carrier

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(212) 697-8068
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Omaha, NE 68107
(402) 731-8820

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The Pioneer in Home Satellite Receivers is doing it again: Norsat is making history.

Now, the '3000' Series changes the whole picture once and for all!

NORSAT puts solid experience and expertise behind each unit. The key is EXPERIENCE

Few—if any—companies now active in the satellite television industry can claim NORSAT's pioneering, background and experience.

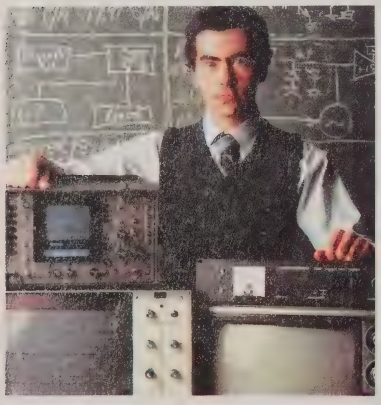
NORSAT founder Rod Wheeler designed and built the world's first home satellite receiver.

From making history to making state-of-the-art equipment, NORSAT continues to lead the industry.

Now, with the new '3000' Series, satellite television will never be the same. That's good—for NORSAT, its dealers and its customers.

Resorts, remote communities, construction camps, resource exploration outposts, hotels, motels, cabarets and bars, as well as cablevision outlets—all are using NORSAT technology to receive the world-wide television experience.

In the fast-changing world of high technology, the EXPERIENCE factor is often overlooked. When it comes to



making a major commitment—either as a dealer or as an end-user—check the Company you're considering.

And check out their EXPERIENCE.

NORSAT led the way in 1977. We continue to lead through the 1980s.

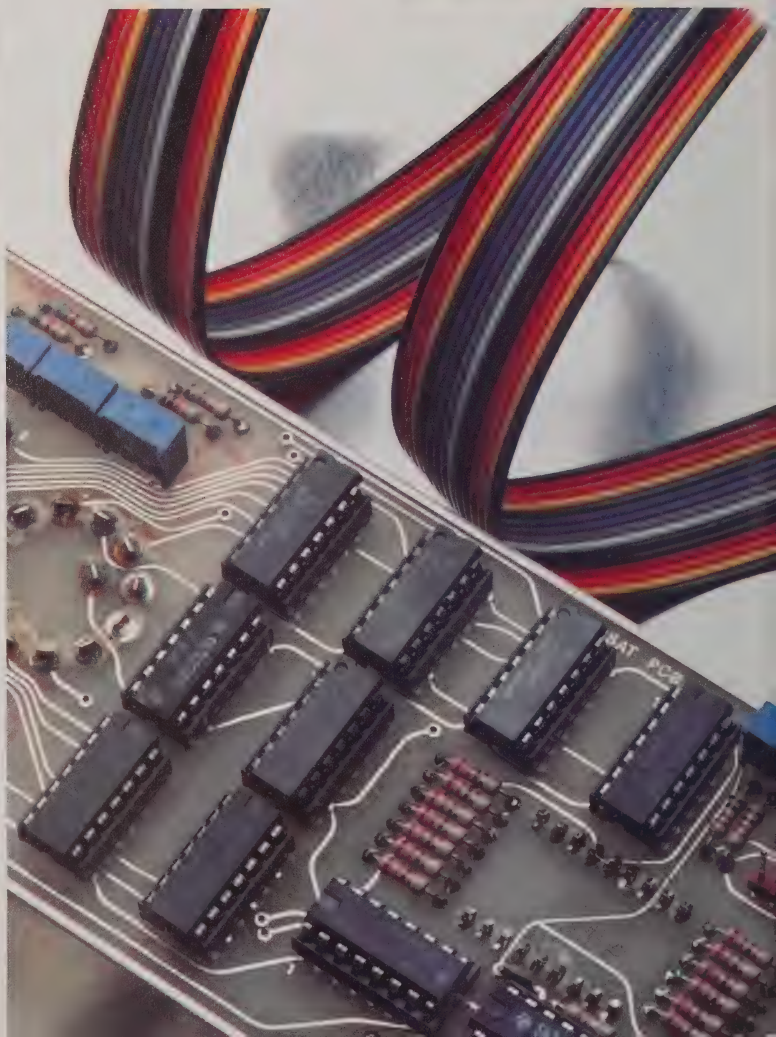
The NORSAT History.

Canada's first private earth-station was built in June 1977. Rod Wheeler, then managing WHTV in Whitehorse, Yukon, brought Ted Turner's WTBS to his viewers "live, via satellite".

Overwhelming response convinced Wheeler of the huge potential in home TVRO systems. Later that year, his family became Canada's first to own a private home terminal.

To offset the high cost of microwave electronics, he set up Northern Satellite Systems and began an R&D program that resulted in the world's first home satellite receiver, the PT 1024, demonstrated at a cable show in July 1978.

Generations of prototypes and thousands of dollars went towards the goal of producing a low-cost, high quality, reliable receiver.



Many problems solved, Wheeler moved to Vancouver, B.C. and began manufacturing as NORSAT.

Ongoing R&D has yielded superior products through four generations of receivers. NORSAT continues a major

commitment to build the best cost-performance ratio products for the dynamic satellite television market.

We're proud to be a pioneer of this exciting industry.

The things that count are the things NORSAT offers: Designed Dependability is one.

NORSAT's approach to design and manufacturing centers on this solution to potential problems: stop the problem before it happens!

In all our manufacturing, only highly reliable, quality components are used. Intensive pre-testing, production testing and quality control 'burn-ins' assure reliable long-term performance.

For you it means years of trouble-free performance. For NORSAT it means minimal service costs and a solid reputation for quality.

The NORSAT Warranty—a full year parts and labour—reflects confidence in our products and people.

Service—it has to mean more than just a repair shop.

The NORSAT philosophy includes the way we look at service as well. Continuous customer satisfaction is the beginning.

If a problem occurs in the field, our factory service division is supported by all aspects of our operation, especially our R&D design engineers who pay close attention to field performance. For normal statistical component problems, the technicians are supported by production inventory, for instant parts availability.

There is another customer service: NORSAT specialists can design and develop complete commercial TVRO head-end systems to your specifications. This team is augmented by experienced installation professionals to solve any on-site problems in installations.

NORSAT's years of proven experience assure you of prompt, professional service in or out of our one-year warranty program.

New Technology and new Techniques. NORSAT is committed to quality Manufacturing.

That commitment centers on our plant in Surrey, B.C., Canada. Here, each NORSAT product module is *hand*-assembled. It is tested at every stage of production.

Only after passing final quality assurance does it proceed to a critical test-run for 48 hours. Then, after being performance certified, the unit can be shipped.

NORSAT's manufacturing concept centers on the integration of all phases of operation into one facility.

This lets us apply and reference all design standards and resolve any problems before the unit leaves our premises.

Manufacturing depends on the best technical expertise available today. At NORSAT, we have it. The result is highest quality and reliability.

R&D—more than just a term, Research and Development is the strongest foundation of the NORSAT structure.

"Finding a better way"—that was the founding philosophy for NORSAT. The corporate philosophy of striving for excellence is reflected in the R&D Division.

Under the direction of Klaus Bischoff, NORSAT's R&D Division has a continuous challenge to meet: finding new, better, more cost effective ways of serving the industry.

Creative personnel, the best test equipment, production engineering right at hand and in-depth market research all assure a long, healthy future for NORSAT products.

The R&D Division works closely with production staff, distributors, dealers, marketing and service divisions to evolve newer, better products for the satellite TV market.

It is this attention to consumer needs and demands that has enabled NORSAT R&D staff to generate the exciting new '3000' Series.

For while we're proud to be pioneers, the *future* is our goal!

People and Product—
meet NORSAT Dealers.

Associated dealer requirements are met through the NORSAT Marketing Division's 'Dealer Plan'. From hard-copy ads, signage mats, brochures, posters and other print support material, to display inventory, training seminars, market studies and co-op programs, the NORSAT Market Service Division assists dealers in increasing sales and supporting customers with service.

Continued attention to your needs, in marketing, product development and service standards, helps NORSAT maintain its industry leadership.

All over North America, people are proud to be "Wheeler Dealers!" The NORSAT name for quality supports them every step of the way.

A solid company
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Technological expertise and experience are of great value, but corporate structure is just as important.

NORSAT's R&D programs are costly but critical to advancing the state of the art. We're proud of having achieved substantial financial stability by becoming a public company.

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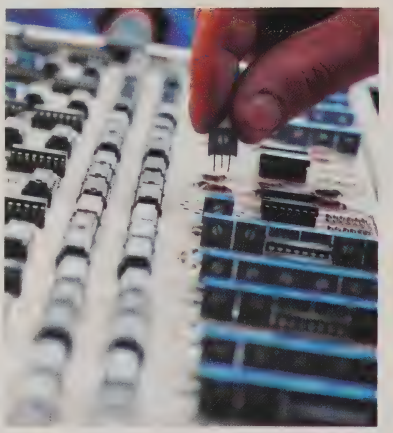
Canada V3S 4N9
Telephone (604) 533-4371
Telex 04-365624



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Kansas City, MO 64141
(816) 453-6000

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(203) 965-3634

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Satellite Communications Division
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(305) 724-3537

Hastings Antenna
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Hastings, NE 68901
(402) 463-3598

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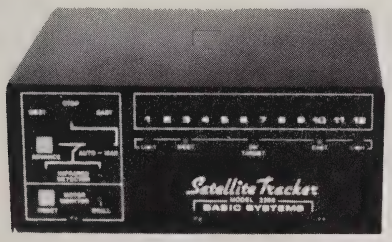

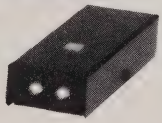

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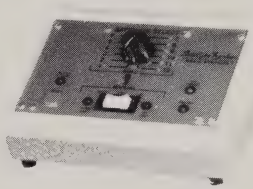

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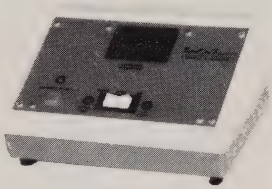

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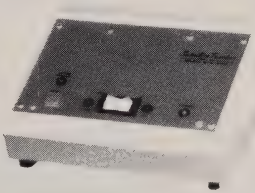

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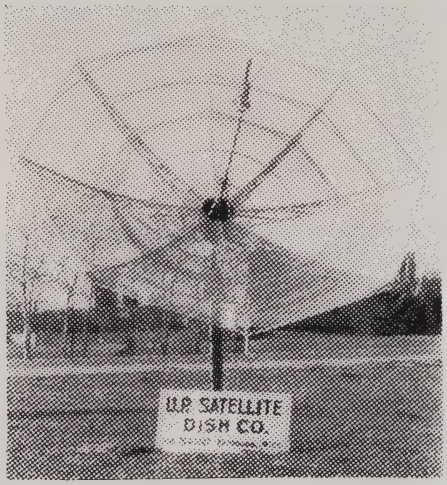

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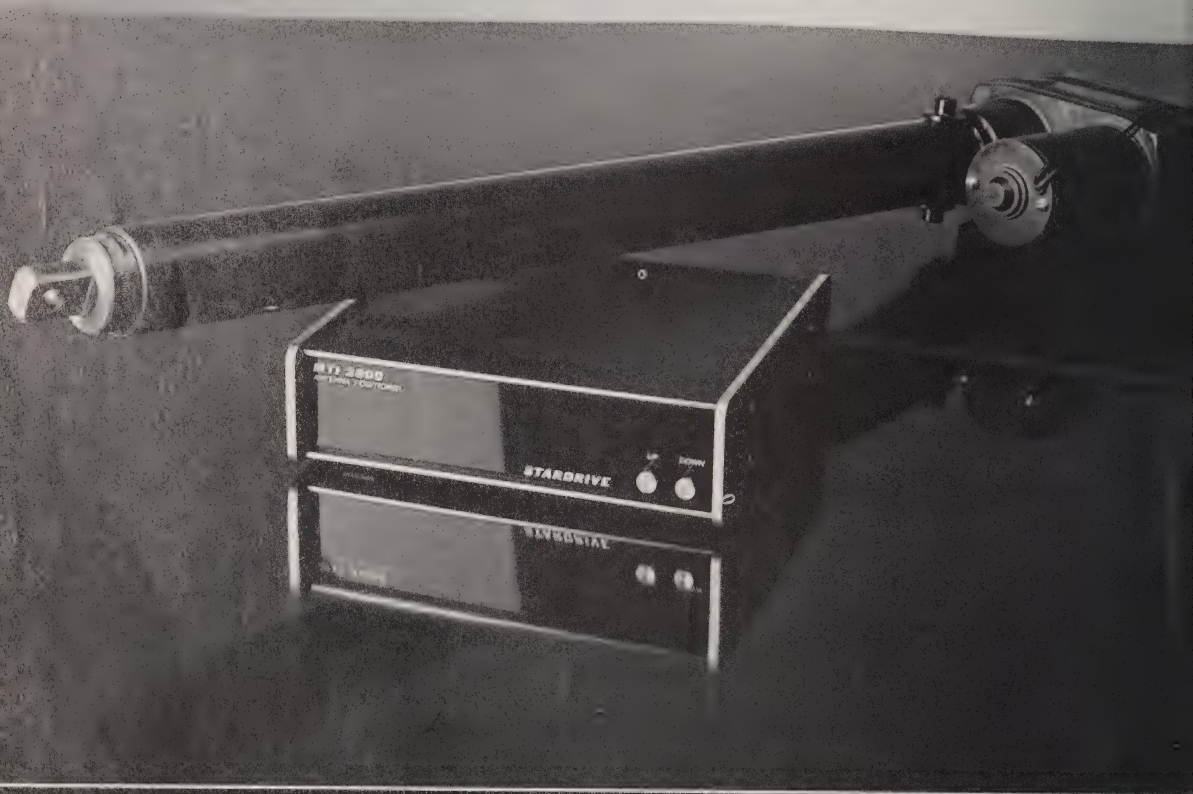

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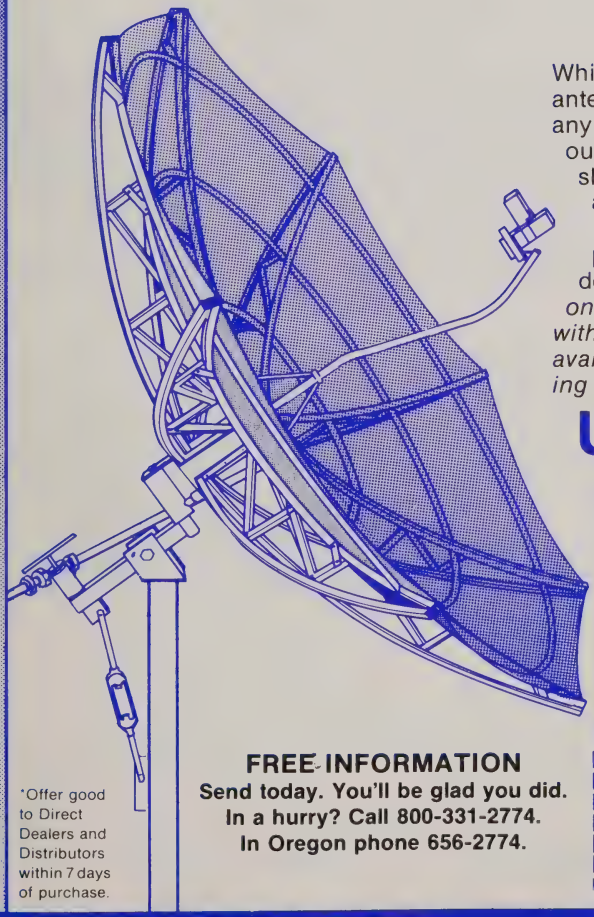

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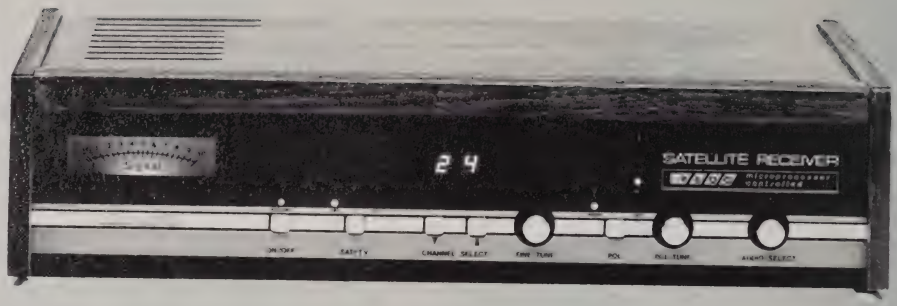

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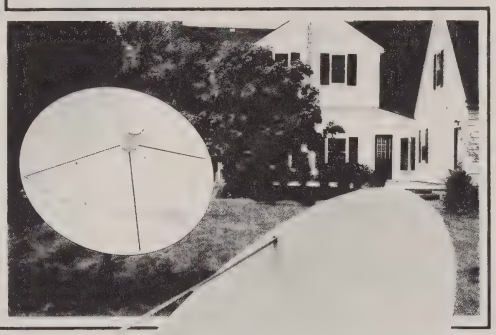

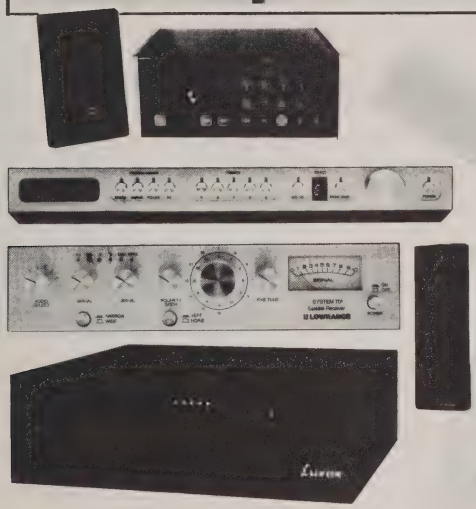

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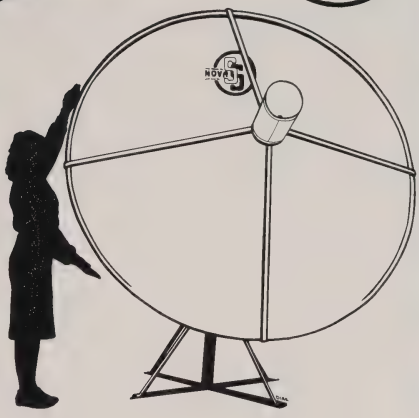

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f/D	.3
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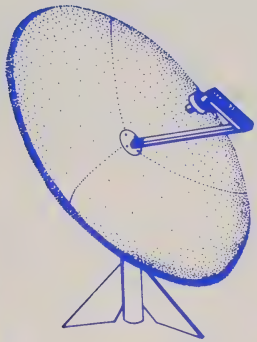

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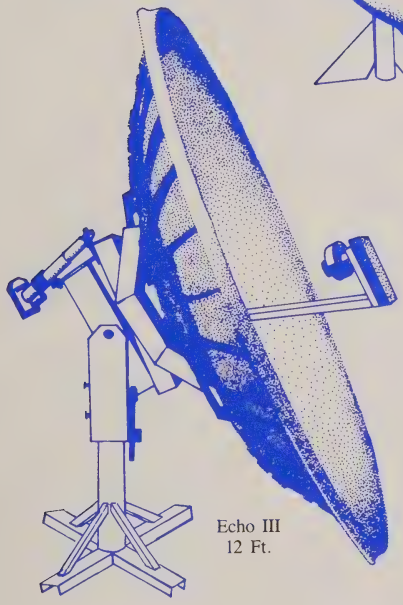

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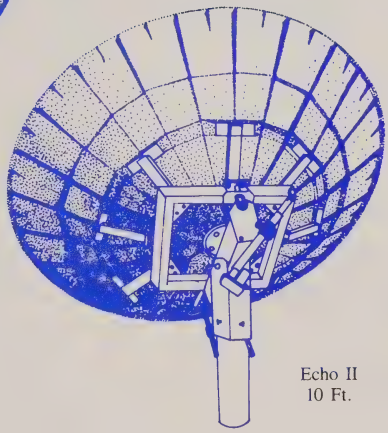

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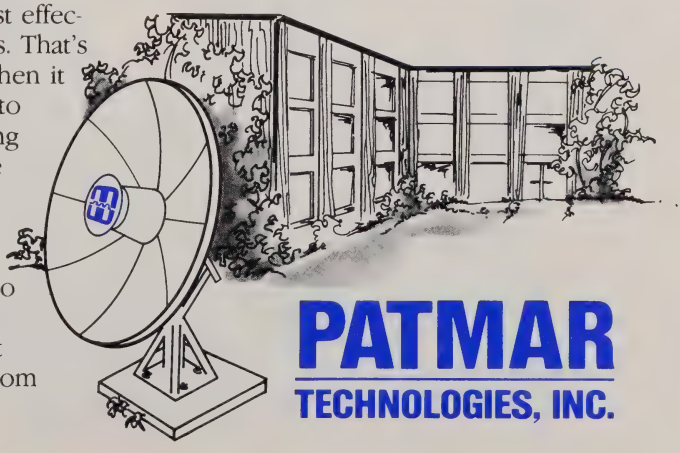

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The TVRO industry is no longer a simple game. It seems the business has vaulted from the backyard to the boardroom in one quantum leap. This rapid change has spawned a higher level of sophistication which demands a different approach, a fresh style, a stronger commitment.

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So, while others treat this business as a pleasant pastime, a diversion, an amusing way to make money, the professionals at VIDARE take it a bit more seriously. To them the manufacture and sale of top quality TVRO equipment is no game. To them it's a way of life!

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SATELLITE GLOSSARY

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Alignment The process of tweaking an electronic circuit through the use of screwdriver-adjustable components to maximize the sensitivity and signal-receiving capability of the circuit.

Amplifier A device used to increase an electronic signal level.

ANIK The Canadian domestic satellite system that transmits Canadian Broadcasting Corporation's (CBC) network feeds throughout the country. ANIK is also used heavily by the Canadian telephone companies to bring voice communications to major metropolitan centers and small communities throughout the country.

Antenna A metallic or metallic-coated device connected to a transmitter or receiver that amplifies the high-frequency AC signal that are propagated to or received from the atmosphere. Depending on their use and operating frequency, antennas can take the form of a single piece of wire or sophisticated parabolic-shaped dish.

Apogee The point in an elliptical satellite orbit that is farthest from the surface of the earth. Geosynchronous satellites that maintain circular orbits around the earth are first launched into highly elliptical orbits with apogees of 22,300 miles. When the communications satellite reaches its initial apogee, small on-board thruster rockets are fired to nudge the satellite into its permanent circular orbit of 22,300 miles. (See **Geosynchronous.**)

Attenuation The process of reducing the level of a signal either intentionally by means of an attenuator or by a natural process. Attenuators are passive devices used in the satellite receiver. They are also heavily used in the CATV business to compensate for excessively high level signals for those homes nearest the CATV distribution amplifier. (See **Distribution Amplifier.**)

Automatic Gain Control (AGC) A circuit which boosts or retards gain to compensate for temporary gain shifts in the system.

Automatic Frequency Control (AFC) A circuit which locks the receiving unit on to the frequency chosen and prevents drifting from that frequency.

Az-El Mount Antenna mount that requires two separate adjustments to move from one satellite to another; Azimuth and elevation.

Azimuth Angle The angle of rotation (horizontal) that a ground-based parabolic antenna must be rotated through to point to a specific satellite in a geosynchronous orbit. The azimuth angle for any particular satellite can be determined for any point on the surface of the earth given the latitude and longitude of that point. It is defined with respect to due north for convenience.

Bandpass Filter A device or circuit that passes a specific group of frequencies.

Bandwidth The range of frequencies allowed to pass through a device. The channel width of a receiver.

Baseband The basic direct 6-MHz output signal from a television camera, satellite television receiver, or videotape recorder. Baseband signals can be viewed only on studio monitors. To display the baseband signal on a conventional television set, a remodulator is required to convert the baseband signal to one of the VHF or UHF television channels that the TV set can be tuned to receive.

Beamwidth The angle or conical shape of the beam the antenna projects. Larger antennas have narrower beamwidths and can pinpoint satellites more precisely.

Bird The actual communications satellite. A typical bird weighs several thousand pounds, has an average lifetime of seven years, and is parked into a circular orbit at an altitude of 22,300 miles above the earth. The satellite acts as an electronic mirror, retransmitting telephone, video, and data signals fed up to it by network control centers, and relaying these signals to the earth via geographically scattered receive-only satellite terminals. (See **Geosynchronous, TVRO.**)

Block Downconverting The multi conversion process of converting the entire band to an intermediate frequency (4GHz to 1GHz) for transmission to multiple receivers, where the next conversion takes place.

BNC Connector A standard medium-sized twist-lock coaxial cable connector used at higher frequencies throughout the television industry and by many satellite TV receivers. Other popular connectors include the larger screw-in Type N and the smaller miniature-type connectors.

Buttonhook Feed A "?" shaped piece of waveguide directing signal from the feed to the LNA behind the antenna.

C-Band The 3.7 to 4.2 GHz Satellite communication band.

Carrier The basic radio or television transmitter's signal (information carrier). The carrier is modulated by manipulating its amplitude or its frequency (shifting it higher or lower) in direct relation to the video signal coming to the television or audio signal originating from a microphone. Satellite carriers are frequency modulated. (See **FM.**) The term is also used in a nontechnical sense to describe operating agencies (satellite carriers).

Carrier Frequency The main frequency on which a radio station, television station, or microwave transmitter operates. AM radio stations operate in the frequency band from 535,000 cycles per second (kilohertz) to 1600 kHz. FM radio stations operate in the frequency band from 88 to 108 MHz. Terrestrial television station transmitters operate in the frequency band whose channels range from 54 MHz (Channel 2) to several hundred megahertz. Microwave and satellite communications transmitters operate in the band from 1 to 6 gigahertz (a gigahertz is one billion cycles per second). (See **Modulation.**)

Cassegrain Antenna The antenna principle that utilizes a subreflector at the focal point, which reflects energy to or from a feed located at the apex of the main reflector.

C-Band The 4-6-GHz frequency band used by the domestic and international communications satellites. To transmit signals to the earth, the 4-GHz (actually 3.7- to 4.2-GHz) band is used. (See **Microwave.**)

Channel A frequency band in which a specific broadcast signal is transmitted. Channel frequencies are specified in the United States by the FCC. Television signals require a 6-MHz-wide frequency band to carry all the necessary picture detail. (Compare this with a typical high-fidelity audio channel of 15,000 Hz!)

Circular Polarization Utilized by INTELSAT satellites. Unlike domestic North American satellites that utilize vertical or horizontal polarization, the international INTELSAT satellites transmit their signals in a rotating corkscrew-like pattern as they are downlinked to earth. In some satellites, both right-hand rotating and left-hand rotating corkscrew-like signals can be transmitted simultaneously and on the same frequency, thereby doubling the capacity of the satellites to carry communications channels.

Clarke Orbit That circular orbit in space 22,300 miles from the surface of the earth at which geosynchronous satellites are placed. First postulated by the science-fiction writer Arthur C. Clarke in *Wireless World* in 1945. Satellites placed in these orbits, although traveling around the earth at thousands of miles an hour, appear to be stationary when viewed from a point on the earth, as the earth is rotating upon its axis at the same angular rate that the satellite is traveling around the earth. Modern techniques allow very tight control over satellite position in orbit, so that earth terminal antennas can be fixed (non-tracking). (See **Station-keeping.**)

C/N (Carrier-to-Noise Ratio) The ratio of the power in a satellite signal carrier to the received noise as measured in decibels. The larger the ratio, the better the television picture looks. If C/N is below 7 dB, the picture quality is poor; above 11 dB, the picture quality is excellent. (See **Threshold Extension, dB.**)

Coaxial Cable A transmission line in which an inner conductor is surrounded by an outer conductor, or shield, and separated by a nonconductive dielectric, typically foam. Coax cables have the capacity to carry enormously high-frequency signals and thus are used by CATV companies for their multisignal distribution. Coax cables also connect the backyard satellite TV antenna to the TV-set-top satellite television receiver.

Common Carrier Any organization that operates communications circuits used by other people. Common carriers include the telephone companies as well as the owners of the communications satellites, RCA Americom Inc., Western Union Telegraph Corporation, and COMSAT General Corporation (which leases its COMSTAR satellites to AT&T).

Cross Polarization The resulting condition when LNA is located 45 degrees between horizontal and vertical polarization.

dB (Decibel) A mathematical ratio developed originally by Alexander Graham Bell to express logarithmically the relationship between two different levels or signals. Typically used in the measurement of the power of a signal in a channel compared with the power of the noise in that channel; a 3-dB increase in signal is equivalent to a signal that is twice as strong. A hi-fi stereo set requires a signal-to-noise ratio of at least 60 dB to be considered acceptable by the average listener. A telephone channel can have a signal-to-noise ratio of only 30 dB to be considered acceptable. The signal-to-noise ratio of a good-quality television picture should be at least 45 dB.

dBi Decibels of gain, relative to isotropic. The term dBi is used properly to express the gain of an earth terminal antenna, although often a simpler form, dB, is used. The gain of the antenna, *G*, is used to compute the G/T of the earth terminal, which determines the ultimate signal of the received signal.

dBm The ratio in dB of the power of a signal as compared with a 1-milliwatt reference power.

DBS (Direct Broadcast Satellite) A new generation of satellites designed to operate in the Ku-band (12-14 GHz). The Canadian ANIK B satellite has four such transponders, which are used for direct reception by 3- to 5-foot antennas in an experimental program. Higher frequency DBS satellites have the advantage of allowing smaller receive antennas to be used, but numerous difficulties need be overcome before the service can be introduced in any significant fashion. In the United States COMSAT has proposed the creation of a new DBS satellite system to be constructed and operated by its Satellite Television Corporation subsidiary in the mid- to late 1980s. Although not originally intended for this use, the existing C-band communications satellites essentially function as direct broadcast satellites when their signals are picked up by an 8-foot or larger backyard home satellite TV antenna.

eclination Angular measurement in degrees relating to a deviation error in polar mounted antennas.

emodulator A satellite receiver circuit that extracts or demodulates the video and audio signals from the received microwave carrier.

etector A demodulation circuit used in a satellite television receiver to recover the audio and video signals from the carrier. (See **Demodulator**.)

ipole A type of antenna. The typical "rabbit ears" television antenna is a simple dipole. Other dipoles are sometimes used in the feedhorn assembly of a satellite television antenna.

irth Video noise or fuzziness caused by poor video demodulation. May appear when C/N ratio is adequate to eliminate sparkles.

istribution Amplifier Wideband amplifier operating at the VHF television channel frequencies used by the CATV companies periodically to strengthen the weakened signals as they are transmitted down the CATV company's cable network. Distribution amplifiers are also used in apartment and other MATV, or master antenna television, installations, and some models operate on baseband signals as well.

ither Appears as a 30Hz flickering in the picture, usually caused by insufficient removal of the 30Hz dispersion waveform transmitted with the video from the satellite. Intention is to prevent the satellite signal from interfering with terrestrial microwave links.

own-Converter That portion of the satellite television receiver that converts the signals from the 4-GHz microwave range to (typically) the more readily used 70-MHz range. Down-converters typically were located physically at the front end of the receiver, requiring bulky and expensive coaxial cable feeds from the antenna to the receiver. Newer designs have seen the down-converter placed at the antenna itself, often in combination with the LNA, allowing miniature CATV-like coaxial cable to bring the satellite TV signal into the house. This type of design allows more flexibility in the location of the antenna with respect to the house.

ownlink The 4-GHz frequency range utilized by the satellite to retransmit the television signal down to earth for reception by the TVRO ground stations. (See **TVRO**.)

ual Orthomode Coupler Simultaneously delivers a horizontally and vertically polarized signal for use with two LNAs.

ual Conversion Downconverter Converts from 4 GHz to 70 MHz through an intermediate conversion step. More expensive and used on multiple receiver installations. Eliminates need for isolators.

arth Station The term used to describe the combination of antenna, low-noise amplifier (LNA), down-converter, and receiver electronics used to receive a signal transmitted by a satellite. Earth station antennas vary in size from the 10-foot- to 20-foot-diameter size used for TV reception, to as large as 100 feet in diameter for international communications.

EIRP (Effective Isotropic Radiated Power) A measure of the power of a satellite television signal received on earth. EIRP is expressed in dBw or the ratio of the power of the signal as compared with a 1-watt reference signal. Satellite common carriers calculate EIRP signal strengths when the satellites are tested before launch, and these studies are used to produce footprint maps showing the varying satellite signal strength as expected to be received throughout the United States. At the boresight of a typical DOMSAT, usually aimed at the continental United States (or CONUS) center-country point, the satellite EIRP may be as high as 37 dBw or higher. In areas such as Southern California or Florida, the EIRP can drop to 30 dBw. There is a direct relationship between EIRP as received on the earth and the required antenna size. In areas whose signal strength is 34 dBw or above, good-quality satellite television reception can be accomplished with a 10-foot parabolic antenna and a 120-degree LNA, a rather inexpensive combination. The antenna size can be reduced even further, depending on the threshold characteristic of the receiver used and the performance margin desired.

Elevation Angle The upward tilt to a satellite antenna measured in degrees required to aim the antenna at the communications satellite. When aimed at the horizon, the elevation angle is zero. If it were tilted to a point directly overhead, the satellite antenna would have an elevation of 90 degrees.

F/D Ratio Ratio of antenna focal length to antenna diameter. A higher ratio means a shallower dish.

Feed A term used to describe the transmission of video programming from a distribution center. Also used to describe the feed system of an antenna. The feed system may consist of a subreflector plus a feedhorn or a feedhorn only.

Feedhorn A satellite TV receive antenna component that collects the signal reflected from the main surface reflector and channels this signal into the low-noise amplifier (LNA).

Feedline The transmission line, typically coaxial cable, from the satellite antenna to the receiver.

Field Strength Meter A test instrument used in the cable television and broadcast industries to measure the power of a signal in a transmission line or from an antenna.

FM Threshold That point at which the input signal power is just strong enough to enable the receiver demodulator circuitry successfully to detect and recover a good-quality television picture from the incoming video carrier. Using threshold extension techniques, a typical satellite TV receiver will successfully provide good pictures with an incoming carrier noise ratio of 7 dB. Below the threshold a type of random noise, called "sparkles," begins to appear in the video picture.

Focal Length Distance from the feed to the center of the dish.

Focus Point The area toward which the primary reflector directs and concentrates the signals received.

Footprint A map of the signal strength showing the EIRP contours of equal signal strengths as they cover the earth's surface. Different satellite transponders on the same satellite will often have different footprints of signal strength. Footprint maps are available from the common carriers, and from both SST and CATA. (See Appendix 4.) The accuracy of EIRP footprint or contour data improves with the operational age of the satellite, although the actual EIRP levels decrease slowly as the satellite ages.

Frequency The property of an alternating-current signal measured in cycles per second or hertz. In general, the higher the frequency of a signal, the more capacity it has to carry information, the smaller an antenna is required, and the more susceptible the signal is to absorption by the atmosphere and physical structures. At microwave frequencies, radio signals take on a line-of-sight characteristic, and require highly directional and focused antennas to be seen successfully.

Frequency-Agile The ability of a satellite TV receiver to select or tune all 12 or 24 channels (transponders) from a satellite. Receivers not frequency-agile are dedicated to a single channel, and are most often used in the CATV industry. Frequency agility can be via continuously variable tuning or discrete-step (channel selection) tuning.

Gain A measure of the increase in level or strength of a signal, usually measured in decibels. Gain is realized in an antenna by virtue of its signal concentration properties and in an amplifier because of its elevation of a signal to a higher level.

Geodetic South True south after adjusting for magnetic deviation. A polar mount must point to geodetic south.

Geostationary (See **Geosynchronous**.)

Geosynchronous The Clarke circular orbit above the equator, which for a planet the size of the earth is 22,300 miles. (See **Clarke Orbit**.)

Ghost An unwanted, weaker reflected copy of the picture that interferes with the main picture itself. In VHF and UHF receptions, ghosts are caused by the receiver antenna detecting both the direct line-of-sight signal from the transmitter antenna and one or more weaker signals bounced off nearby buildings, mountains, etc. The main technical advantage of cable TV and satellite TV is the elimination of such ghosts.

Gigahertz (GHz) One billion cycles per second. Signals operating above 1 gigahertz are known as microwaves, and begin to take on the characteristics of visible light.

Global Beam An antenna downlink pattern used by the INTELSAT satellites, which effectively covers one-third of the globe. Global beams are aimed at the center of the Atlantic, Pacific, and Indian oceans by the respective INTELSAT satellites, enabling all nations on each side of the ocean to communicate with the satellites. Because they transmit to such a wide area, global beam transponders have significantly lower EIRP outputs at the earth's surface compared with a U.S. domestic satellite system, which covers just the continental United States. Therefore, earth stations receiving global beam signals need to be much larger in size (typically 30 feet to 100 feet in diameter).

G/T (Gain-over-Noise Temperature) A relationship, in decibels, between the gain of a TVRO antenna system and the surrounding ambient noise. As this number increases, the picture quality increases. G/T can be raised by using an LNA with a lower noise temperature or increasing the size of the receive antenna.

Ground Noise Energy created by any molecular motion, expressed in degrees K. Zero degrees K implies no molecular motion hence, no noise.

Guard Channel Television channels are separated in the frequency spectrum by being spaced several megahertz apart. This unused space serves to prevent the adjacent television channels from interfering with each other.

Hardline Type of low loss coaxial cable. It has a continuous metal shield instead of a conductive braid.

Headend The master distribution center of a CATV system in which the incoming television signals from space and distant broadcast stations are received, amplified, and remodulated onto television channels for transmission down the CATV coaxial cable.

Heliax A special type of thick coaxial cable often used to connect TVRO antennas to satellite receivers because of the cable's low-loss transmission characteristics at microwave frequencies.

Hertz Cycles per second. An AC signal or carrier completes a sinusoidal geometric pattern periodically in time. This phenomenon is known as its frequency, and its repetition rate is measured in hertz.

Integrated Circuit (IC) A miniaturized solid-state device that replaces thousands of discrete-component circuit elements. ICs can be fabricated to function as microcomputer circuits, stereophonic amplifiers, and television receivers.

INTELSAT The international satellite consortium that owns and operates the global satellite communications system. INTELSAT is headquartered in Washington, D.C., and its U.S. member, COMSAT, operates the international satellite system under management contract. INTELSAT's satellites carry telephone and television transmission to all parts of the world.

Isolator Allows signals to pass in one direction and attenuates signals in the reverse direction. Isolators are usually required between single conversion downconverters and the LNA.

Kelvin (K°) The temperature measurement scale used in the scientific

community. Zero degrees Kelvin represents absolute zero, and corresponds to minus 459 degrees Farenheit. Thermal noise characteristics of LNAs are measured in degrees Kelvin, with respect to room temperature. (See **Noise Temperature**.)

K_uBand 11.7 to 12.2 Ghz satellite frequency band.

Latitude An angular measurement of a point on the earth above or below the equator. The equator represents zero degrees, the north pole plus 90 degrees, and the south pole minus 90 degrees.

License An operating permit issued by the FCC to run a radio, television, or satellite transmitter. Voluntary licenses can also be obtained from the FCC by mini-CATV companies for their 15-foot or larger TVRO earth stations. While not legally required, the issuance of a TVRO license by the FCC guarantees that no future microwave transmitter can be constructed in the path of the TVRO antenna, thereby minimizing the possibility that future terrestrial interference will occur.

Line Amplifier An amplifier inserted in a transmission line to compensate for the losses in that line.

LNA (Low-Noise Amplifier) A very sensitive preamplifier used at the feedhorn of the TVRO satellite antenna to strengthen the very weak satellite signal. The most important parameter of the LNA is its noise temperature as described in degrees Kelvin. In general, the lower the noise temperature, the better the signal quality will be. Typical LNAs have noise temperatures of 120°K. There is a limited but useful trade-off between the noise temperature of the LNA used and the size of the satellite-receive antenna. The higher the noise temperature, the bigger an antenna required. Conversely, the G/T of an earth terminal can be improved by lowering the LNA noise temperature.

Longitude An angular measurement of a point on the surface of the earth in relation to the meridian of Greenwich (London). The earth is divided into 360 degrees of longitude, beginning at the Greenwich mean. As one travels west around the globe, the longitude increases.

Low-Power TV (LPTV) A new television service proposed by the FCC in October 1980. LPTV broadcasting stations typically radiate between 100 and 1000 watts of power, covering a geographic radius of 10 to 15 miles. Upward of 5000 LPTV stations ultimately will be licensed for operation, many of which will obtain their programming from new satellite television networks now being formed.

Magnetic Deviation The angular adjustment, expressed in degrees, between a magnetic compass indication and the true, or geodetic indication.

Master Antenna Television (MATV) The master distribution coaxial cable television antenna system found in a modern apartment building, condominium complex, or hotel. Really a mini-CATV system in itself, an MATV system can easily be modified, with the addition of a TVRO earth station, to pick up and distribute first-run movies and other satellite programming directly to the MATV users.

MDS (Multipoint Distribution System) A common carrier licensed by the FCC to operate a broadcast-like omnidirectional microwave transmission facility within a given city. MDS carriers often pick up satellite pay TV programming and distribute it via their local MDS transmitter to specially installed antennas and receivers in hotels, apartment buildings, and individual dwellings throughout the area.

Microwave A radio or television signal whose carrier is oscillating at a frequency of 1 GHz or higher. (See **Gigahertz**.)

Microwave Interference Occurs when a TVRO earth station aimed at a distant satellite picks up a second, often stronger, signal from a local telephone terrestrial microwave relay transmitter. Microwave interference can also be produced by nearby radar transmitters as well as the sun itself. Relocating the TVRO antenna by only several feet may completely eliminate the microwave interference.

Modulation The process of manipulating the frequency or amplitude of a radio or television carrier in relation to an incoming video or audio signal.

Modulator A device that modulates a carrier. Modulators are found as components in broadcasting transmitters and in satellite transponders. Modulators are also used by CATV companies to place a baseband video television signal onto a desired VHF or UHF channel. Home videotape recorders also have built-in modulators that enable the recorded video information to be played back using a television receiver tuned to VHF Channel 3 or 4.

Multiple Service Operator (MSO) A major cable television owner. The top 50 MSOs own cable television franchises throughout the United States. Among the big ten are Teleprompter Corporation, Time-Life/ATC, Warner-Amex Cable Communications, Times-Mirror Cable Television (*Los Angeles Times*), and Viacom International.

Narrowcasting The concept of delivering a television program to a very small audience market share. By carrying 20 or more channels of television, CATV companies have begun to threaten the established television networks with their narrowcasting capabilities. LPTV stations threaten to erode the market share of the major television networks as dozens of new and alternative satellite-based television services turn on in the eighties.

Network Television programming and transmission arrangement consisting of a program creation and distribution center, telecommunications channels (either terrestrial, microwave, or satellite video circuits), and viewer delivery mechanisms (typically broadcasting station affiliates or CATV companies). There are over 30 television networks in operation today whose programming can be picked up by satellite.

Noise Energy always present on any signal. In satellite TV the signals are weak so the noise becomes an important limiting factor.

Noise Figure The amount of noise added to the signal at the output of an amplifier, expressed in dB. Zero dB represents a perfect amplifier.

Noise Temperature The noise temperature of a low-noise amplifier (LNA) is expressed in degrees Kelvin with respect to room temperature.

Occasional-Use Transponder A satellite transponder used for television transmission on a periodic basis, typically rented by the satellite common carrier to the programmer for an hourly fee.

Offset Feed A specialized feed offset from the actual antenna focus point but is at the theoretical focus point of the parabolic antenna from which the actual antenna is taken.

Parabolic Antenna The most frequently found satellite TV antenna. It takes its name from the shape of the dish described mathematically as a parabola. The function of the parabolic shape is to focus the weak microwave signal hitting the surface of the dish into a single focal point in front of the dish. It is at this point that the feedhorn is usually located, or a subreflector that reflects the energy back into a feedhorn.

Pay TV The concept made popular by Home Box Office and the CATV companies in which a special decoder box is installed adjacent to the viewer's television set to enable the scrambled pay TV channel to be watched. The viewer pays a per-month or per-movie charge for the rental of the box. Pay TV services are also provided by MDS operators and STV television stations that transmit their pay TV signals over the air in a scrambled mode.

Perigee The point in an elliptical satellite orbit that is closest to the surface of the earth.

Polar Mount Antenna mount used to allow only one required movement to point the antenna to any satellite in the Clark belt. (As opposed to Az-El.)

Polarization A technique used by the satellite designer to increase the capacity of the satellite transmission channels by cleverly reusing the satellite transponder frequencies. In linear polarization schemes half of the transponders beam their signals to earth in a vertically polarized mode; the other half horizontally polarize their downlinks. Although the two sets of frequencies overlap, they will not interfere with each other. To receive these signals on earth successfully, the TVRO earth station must be outfitted with a properly polarized feedhorn to select the vertically or horizontally polarized signals as desired. In most home TVROs the feedhorn is simply rotated 90° to change from one to another. In deluxe TVRO installations the feedhorn will have the capability of receiving the vertical and horizontal transponder signals simultaneously, and routing them into separate LNAs for delivery to two or more satellite television receivers. Unlike the U.S. and Canadian domestic satellites, the INTELSAT series use a technique known as left-hand and right-hand circular polarization.

Power The strength of a signal as measured in watts. The output power of a typical satellite transponder is only 5 watts, equivalent to shining a small flashlight at the surface of the earth from a point 22,300 miles in space. Combined with a satellite antenna gain of 30 dBi, this would result in an EIRP of approximately 36 dBw toward the earth.

Program Control Tones Special musical tones transmitted by a programmer's network control center before and after each program. Program control tones are used by the CATV companies automatically to switch earth station receivers and associated equipment at their feed ends.

Protected-Use Transponder A satellite transponder provided by the common carrier to a programmer with a built-in insurance policy. If the protected-use transponder fails, the common carrier guarantees that the programmer will switch over to another transponder, often preempting some other nonprotected programmer from the other transponder. Protected-use transponders cost more to lease than nonprotected-use transponders.

RG-58 50 OHM coaxial communication cable.

RG-59 75 OHM coaxial communication cable.

Radio-Frequency Spectrum Those frequency bands in the electromagnetic spectrum that range from several hundred thousand cycles per second (very low frequency) to several billion cycles per second (microwave frequencies.

Receiver An electronic device that detects and decodes a radio or television signal. The typical home television set is a receiver designed to detect UHF and VHF television signals and display them on a built-in television screen. The typical satellite television receiver detects signals in the microwave range that are picked up by a satellite antenna and amplified by an LNA. The satellite television receiver provides its output as a baseband video signal to a TV monitor or as a VHF television channel that can be fed into an ordinary television set.

Registered TVRO A satellite television receive-only earth station for which a license has been issued by the FCC. (See **License**.)

RF Adaptor An add-on modulator that interconnects the output of the satellite television receiver to the input (antenna terminals) of the user's television set. The RF adaptor converts the baseband video signal coming from the satellite receiver to a radio-frequency (RF) signal that can be tuned in by the television set on VHF Channel 3 or 4.

Satellite A smaller body revolving in orbit around a larger body in space. The moon is a natural satellite of the earth. Man-made satellites travel in a variety of orbits around the earth, as the earth rotates on its axis. All major communications satellites are placed into geosynchronous orbits around the earth.

Satellite Receiver A wideband FM receiver operating in the microwave range, converting the incoming C-band RF signal to a standard baseband video signal.

Satellite Terminal A receive-only satellite earth station consisting of an antenna (typically parabolic in shape), a feedhorn, a low-noise amplifier, a down-converter, and a satellite receiver.

Cont'd on page 97

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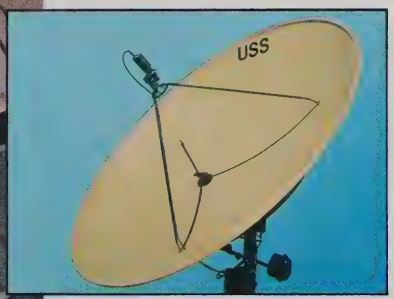

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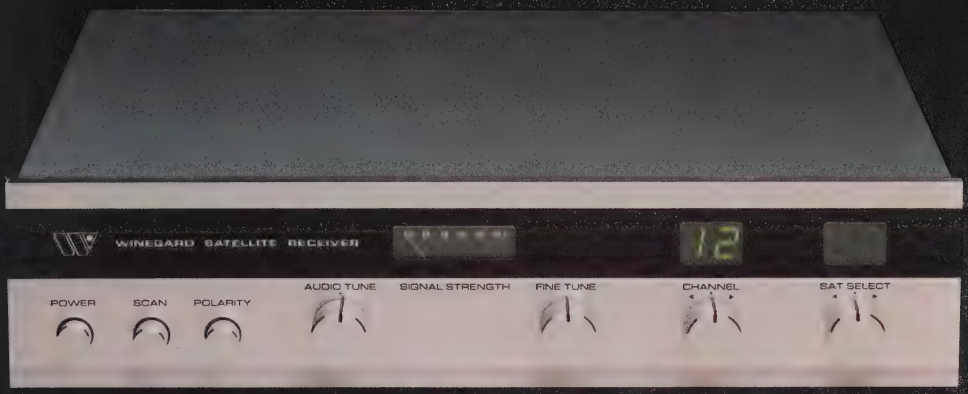

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3 — (Time, Inc.)
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5 — Showtime/TMC
6 — Spanish Int'l Net
7 — Cable News Network
8 — (Westinghouse)
9 — ESPN
10 — Showtime/TMC
11 — Continental Broadcast (CBN)
12 — Home Team Sports (DC-MD)
13 — C-SPAN
14 — Showtime/TMC
15 — WOR-TV (Ch. 9, New York)
16 — Showtime/TMC
17 — (Time, Inc.)
18 — WTBS/CNN
19 — (Time, Inc.)
20 — Galavision
21 — Cinemax/East
22 — Seattle Sports
23 — HBO/East
24 — Disney Channel/West

RCA SATCOM 3R (131 W)

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2 — PTL (People That Love)
3 — WGN (Ch. 9, Chicago)
4 — The Movie Channel/East
5 — The Movie Channel/West
6 — WTBS (Ch 17, Atlanta)
7 — ESPN (Entertainment & Sports)
8 — CBN (Continental Broadcasting)
9 — USA Cable Network
10 — Showtime/West
11 — MTV: Music Television
12 — Showtime/East
13 — HBO/West (Home Box Office)
14 — CNN (Cable News Network)
15 — CNN Headline News
16 — HTN (Home Theater Network)/ TLC (The Learning Channel)
17 — Lifetime
18 — EWTN (Eternal Word TV Net)/ Reuters Monitor (encoded)
19 — C-SPAN (Congressional Coverage)
20 — Cinemax/East
21 — The Weather Channel
22 — MSN/Sports blackout net/OV
23 — Cinemax/West
24 — HBO/East

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WESTAR 4
2, 4 — Hughes TV
5, 23, 24 — Bonneville/OV
6 — XEW-TV (Mexico City)
15, 17, 21, 23 — PBS Network
11 — Catholic Telecom Net (encoded)
11, 18, 19, 20 — Wold Comm./OV

COMSTAR D-3
8, 13 — ABC-TV
10, 17 — CBS-TV
1 — NBC-TV

COMSTAR D-4
9, 11 — ON-TV (encoded)
13 — ESPN
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Occasional Video (OV) or Phone Traffic Delivered On M

Principal Satellite Footprints

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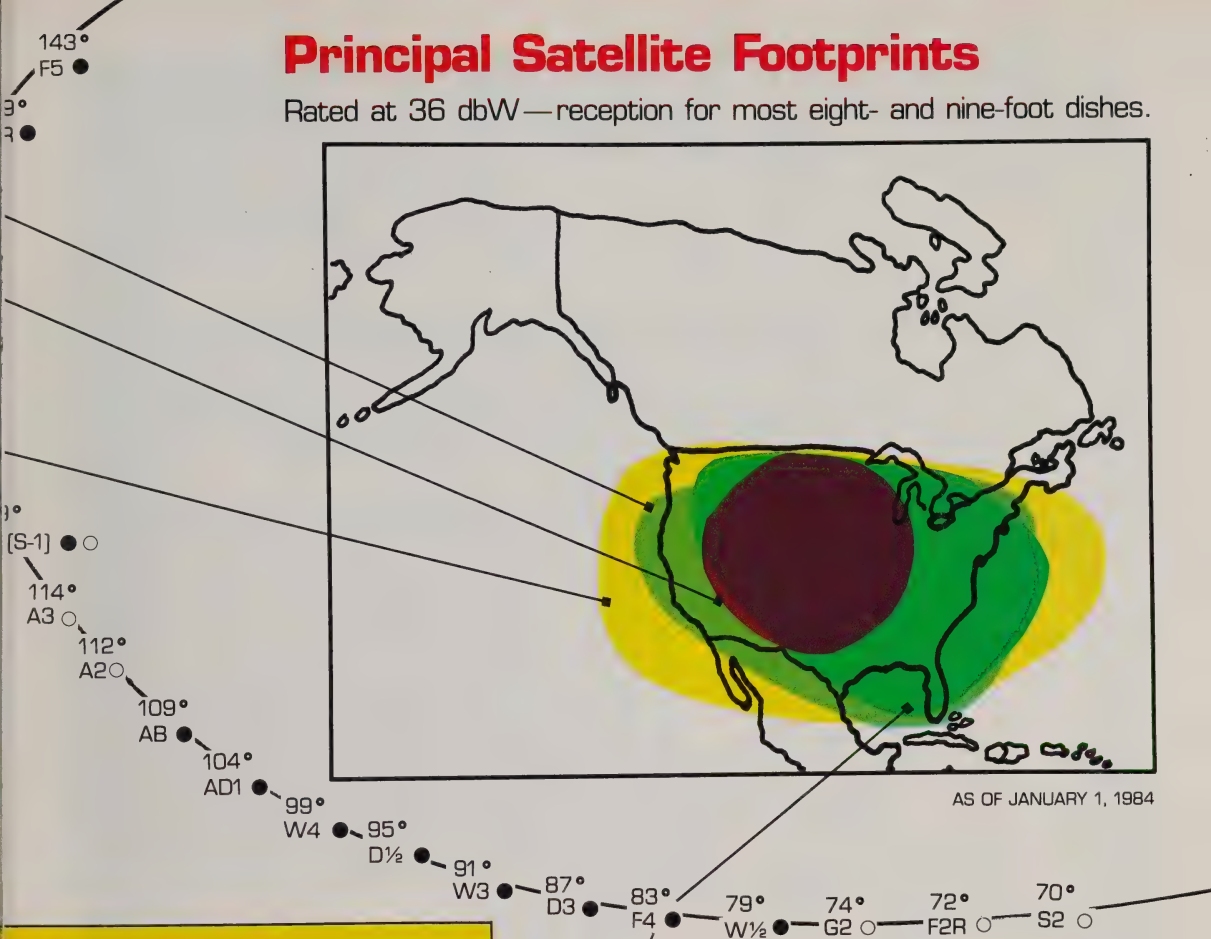

AS OF JANUARY 1, 1984

○ - Future Bird
● - Existing Bird

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W = WESTAR (Western Union)
A = ANIK (Canadian)
D = COMSTAR (ATT/GTE)
G = GALAXY (Hughes Comm.)
S = SPACENET (Southern Pacific)

TAR 5 (123 W)

ughes Television Net/Blue Max (encoded)
elec-TV
adison Square Garden
merican Network
RTS/Lifetime
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Channel Lineup:
1 - Movie Time
2 - Showcase
3 - ESPN
4 - UPI News Monitor
5 - Variety Channel (music, children)

ATCOM 4 (83 W)

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e Program Net
Sports/Dallas
Blackout Feed
al Christian Net
Sports/Houston
y Channel

15—BizNet/TVSC
17—Trinity Brdcstg.
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Cont'd from page 94

tenna, extending forward from and normal to the perimeter. Prevents interference from entering the antenna from the sides.

Side Lobes Energy pickup offset from the main focus direction of the antenna.

Signal Information sent through electronic means from a transmitter to a receiver, by either an electric circuit or radio transmission technique.

Signal-to-Noise Ratio (S/N) The measure in decibels of the power or strength of a signal as measured in watts compared with the power of the noise surrounding the signal. Just as signal-to-noise ratios are important in high-fidelity stereophonic systems, so a high signal-to-noise ratio means a better, clearer, snow-free television picture. The S/N of the television signal output from a satellite earth terminal receiver is determined directly by the C/N ratio at the input and the C/N threshold of the receiver.

Single-Channel-per-Carrier (SCPC) A special voice or audio service offered by the satellite common carriers, used to transmit several dozen audio signals over a single satellite transponder. Although many audio channels could be handled (a transponder has the capacity to carry 2000 voice conversations normally), each audio signal is transmitted with more power, thereby allowing much smaller receive-only antennas to be used at the earth stations. Using SCPC techniques, the American news wire services are transmitting audio news feeds to radio stations nationwide equipped with antennas only 3 to 4 feet in diameter.

Slot Term used for the longitudinal angular position in the geosynchronous orbit into which a communications satellite is parked. Above the United States, communications satellites are typically positioned in slots that are spaced 3 to 5 degrees apart.

Snow A form of noise picked up by a television receiver, caused by a weak signal. Snow is characterized by alternate dark and white dots randomly appearing on the picture tube. To eliminate snow, a more sensitive receive antenna must be used, or a lower noise temperature LNA must be used.

Space Shuttle The U.S. space transportation system that will carry most major satellite packages into near-earth orbit over the next 20 years. As the space shuttle has only enough thrust to reach an orbit of several hundred miles, an additional booster rocket system will be carried in the space shuttle hold along with the communications satellite. Upon its release from the space shuttle hold, the booster rocket will "kick" the communications satellite into its 22,300-mile geosynchronous orbit.

Sparklies A form of satellite television "snow" caused by a weak signal. Unlike terrestrial VHF and UHF television snow that appears to have a softer texture, sparklies are sharper and more angular noise "blips." As with terrestrial reception, to eliminate sparklies either the satellite antenna must be increased in size, or the low-noise amplifier must be replaced with one that has a lower noise temperature.

Spherical Antenna The second major form of satellite television earth station antenna. The spherical antenna (unlike the parabolic antenna) has the ability to simultaneously to see, and thus receive, several satellites in orbit. Because of this feature, spherical antennas are becoming increasingly popular for the home satellite TV user who may wish to switch from satellite to satellite easily and conveniently. (See **Parabolic Antenna.**)

Splitter A device with one input providing two or more outputs in the same frequency.

Spot Beam A focused transponder pattern used by the INTELSAT satellites in a limited geographical area. Spot beams are also used by the U.S. domestic satellites to deliver certain transponder signals to Hawaii, Alaska, and Puerto Rico.

Subcarrier A second signal piggybacked into a main signal to carry additional information. In satellite television transmission the video picture is transmitted over the transponder's main carrier. The corresponding audio is sent via an FM subcarrier, which is located at a frequency slot above the video baseband. Some satellite transponders carry as many as four special audio or data subcarriers, whose signals may or may not be related to the main transponder's programming.

Subreflector A small reflector used at the focal point of a parabolic dish antenna to reflect signal energy into the feed beam.

Subscription Television (STV) A broadcasting television station transmitting pay television (usually first-run movies) in a scrambled mode. Over 50 STV stations are presently in operation or planned for cities throughout the United States.

Synchronization (Sync) The process of orienting the transmitter and receiver circuits so that information sent in relation to a precise instant of time by the transmitter will be perfectly related to that same instant by the receiver. Home television sets are "synchronized" by an incoming sync signal with the television cameras in the studios 60 times per second. Horizontal and vertical hold controls on the television set are used to "fine tune" synchronize the receiver to the incoming television picture.

Teleconference A meeting involving at least one uplink and a number of downlinks at different locations. Those attending the meeting at downlink locations usually have telephone links back to the uplink location.

Teletext An "electronic newspaper of the air" consisting of several hundred "pages" of 24-character by 20-line English text displays. Teletext signals can be transmitted simultaneously over a satellite transponder using a data subcarrier. Several satellite programmers are now transmitting teletext signals, and the national television networks have begun to implement their own teletext systems. A special teletext decoder is required to capture and display the teletext pages as they are transmitted.

Terrestrial Interference Interference caused by high power land based microwave links in the 4 GHz band.

Terrestrial TV Ordinary VHF (very high-frequency) and UHF (ultrahigh-frequency) television transmission limited to an effective range of 100 miles or less. Terrestrial TV transmitters operate at frequencies between 54 MHz and several hundred megahertz, far lower than the 4 billion hertz microwave frequencies used by satellite transponders.

Threshold Extension A technique used by satellite television receivers to improve the carrier-to-noise ratio threshold of the receiver by approximately 3 dB. When using small receive-only antennas (10 to 12 feet), a receiver equipped with the threshold extension feature can make the difference between obtaining a good picture or a poor picture because the C/N ratio is above the threshold point.

Translator An unattended television repeater usually operating on a UHF channel. A translator picks up a distant city's broadcast TV station and retransmits the picture locally on another channel. (See **Low-Power TV.**)

Transmitter — An electronic device consisting of oscillator, modulator, and other circuits which produce a radio or television electromagnetic wave signal for radiation into the atmosphere by an antenna.

Transponder — A combination receiver, transmitter, and antenna package, physically part of a communications satellite. Transponders have a typical output of five to 8½ watts, operate over a frequency band with a 36 megahertz bandwidth in the four to six gigahertz microwave spectrum. Communications satellites typically have between 12 and 24 on-board transponders.

Tuner — That portion of a receiver which can variably select under user control a desired signal from a group of signals in a frequency band. By setting the tuner control to the various vhf channels, the viewer is selecting one of 12 different incoming channel frequencies which range from 54 megahertz (channel 2) to 216 megahertz (channel 13).

Turnkey — An installation of a satellite earth station in which all aspects are performed by the manufacturer or dealer.

TV Receiver — A sophisticated electronic device consisting of a vhf and uhf tuner, audio and video amplifiers, and television display monitor. The "everything in one" tv receiver will probably go the way of the hi-fi console of the 1950s, as more and more modular video equipment such as video tape records, home computers, projector television sets, and satellite receivers become popular.

TVRO (Television Receive Only Terminal) — (See *Satellite Terminal.*)

Tweeking — The process of adjusting an electronic receiver circuit to optimize its performance.

Ultrahigh Frequency (UHF) — Officially the band of frequencies ranging from 300 to 3000 MHz. In television use, refers to the set of frequencies starting at 470 MHz which are designated as channels 14 through 70.

Unprotected Use Transponder — A transponder rented to a programmer on an as-is basis by the common carrier. If the transponder fails, the programmer has no recourse to demand replacement or restoral of service by the common carrier. (*See Protected-Use Transponder.*)

Uplink — That set of frequencies used by the satellite distribution center earth station to transmit the video signal up to the satellite.

Video Cassette Recorder (VCR) — Originally developed for commercial use, VCR systems have been purchased by almost four million people in the United States. There are two mutually incompatible schemes: the Beta (Sony) system, and the VHS (Japan Victor Corp.) system.

Videoconference — A teleconference using conventional B&W or color-tv systems. Often carried via satellite to multiple locations.

Vertical Blanking — (See *Blanking Signal.*)

Very High Frequency (VHF) — Officially the band of frequencies from 30 to 300 MHz. In television use, refers to that frequency band reserved for television channels 2 through 13, beginning at 54 MHz and extending up to 216 MHz.

Video Monitor — A television set without the tuner. A video monitor only accepts a baseband video signal, not a vhf or uhf television broadcast signal. Video monitors usually have higher resolution and display quality than conventional television sets.

Westar — The U.S. domestic satellite system owned by Western Union. There are 5 Westar birds. The three original ones are 12-transponder birds, horizontally polarized. They are located at 91° West longitude (Westar 3), and 79° West longitude (Westar 1 & 2 co-located). Two new 24-transponder Westar satellites are located at 99° West longitude (Westar 4) and at 123° West longitude (Westar 5) and have become the major alternative to the RCA Satcom birds for video/CATV programming.

World Administrative Radio Conference (WARC) — An international meeting coordinated by the ITU in which the countries of the world determine which frequencies will be allocated for what services and to whom. The use of domestic communications satellites located in orbits above the United States is determined by the WARC.

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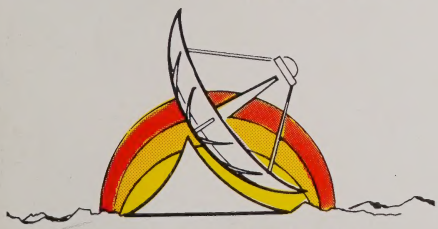

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